IMPERIAL BUREAU
10 SEPT 1928
OF MYCOLOGY

BERMUDA

REPORT

OF THE

DEPARTMENT

OF

AGRICULTURE

FOR THE YEAR

1927

Printed by
THE BERMUDA PRESS, Ltd.
Hamilton, Bermuda

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Board of Agriculture, 1927.

Mr. G. S. PATTON, M.C.P., Warwick, Chairman.
Mr. B. C. C. OUTERBRIDGE, M.C.P., Smiths, Vice-Chairman.
Mr. W. R. LIGHTBOURN, Smiths.
Mr. C. G. GILBERT, M.C.P., Sandys.
Mr. W. A. BARNES, Southampton.
Mr. W. D. HOLLIS, Hamilton.
Mr. F. E. SMITH, St. George's.
Mr. F. W. STEPHENS. Paget,
Mr. M. F. SIMONS, Paget.

Mr. F. C. MISICK, M.C.P., Sandys, appointed 15th August vice Mr. C. G. Gilbert, resigned.

Department of Agriculture, 1927.

Director of Agriculture, E. A. MCCALLAN.
Plant Pathologist, LAWRENCE OGILVIE, M.Sc., M.A., B.Sc.
Inspector of Produce, G. E. WINTER (to 31st January).
E. L. ADAMS (from 1st February).
First Agricultural Assistant, W. R. EVANS.
Clerk, G. L. YOUNG.

Part-Time Officers.

Government Veterinary Officer, R. L. TUCKER, D.V.S.
Assistant Inspector of Produce, E. L. ADAMS (to 31st January).
T. A. HOLLIS, Jr., (from 1st February).
Sub-Inspectors of Produce, T. A. HOLLIS, Jr., (to 31st January).
C. V. S. EARLY, E. C. Case.

Agricultural Station,

Bermuda,

2nd August, 1928.

Sir,

I am directed by the Board of Agriculture to lay before His Excellency the Governor, for the information of the Legislature, the accompanying report of the Department of Agriculture for the year ended 31st December, 1927.

I have the honour to be,

Sir,

Your obedient servant,

HILDA C. LINES,

Acting Clerk, Board of Agriculture.

The Honourable,

The Colonial Secretary,

Hamilton.

Report of The Director of Agriculture For the Year 1927.

The Chairman,

The Board of Agriculture,

Under the provisions of The Agricultural Department Act, 1921, I have the honour to submit for the information of His Excellency the Governor my report for 1927. Reports of other members of the Department are also submitted.

AGRICULTURAL STATION.

An account of the principal work performed at the Agricultural Station follows.

Potato Tests.—A complete report of the work with this vegetable was published as Leaflet No. 11 (December 31st, 1927) and the subject is here dealt with briefly. For some years potato work has consisted largely in testing strains with respect to the presence of virus diseases.

TRIUMPHS.—Many strains of Triumphs were tested. Six strains were planted in the Autumn of 1926. The record for vigour and virus diseases is repeated from the report for that year, and the yields are given of the crop, which was dug in January, 1927.

	Vigour	Leaf-roll	Mosaic	No. of plots	Yield Pounds per rod
(a) Maine-Long Island, Sands	76	1.0	Screened	7	70.5
(b) Nebraska-Long Island, Johnson	93	.8	"	8	77.9
(c) Nebraska-Long Island, Taylor	77	1.1	"	8	77.8
(d) Nebraska-Long Island, Kimball	75	.6	"	8	68.8
(e) Wisconsin-Long Island, Radcliffe	80	1.3	"	20	68.9
(f) Wisconsin-Long Island, Spooner Ex	87	1.6	"	8	74.2

The seed had been grown for the Department at Water Mill, Long Island, New York, and had been furnished free of cost by the growers in Maine, Nebraska and Wisconsin. Strain (e) was similar to that imported commercially from Long Island.

Early in 1927 four commercial importations of seed were made for March planting to provide seed for planting in August and early September. Samples were planted in March and April, and were dug in May and June.

Strain	Leaf-roll	Mosaic	No. of plots	Yield Pounds per rod
(a) Nebraska, Forsling	0	0	2	82.8
(b) Wisconsin, Radcliffe	2	40.5	4	51.8
(c) Montana-Wisconsin, Sharples	seen	3	3½	64.0
(d) Wisconsin, Smith	0	7	3½	73.6

Seed from the above stocks, omitting strain (b), was planted on 9th September, and dug on 7th December. Lack of rain severely reduced the yield.

Strain	Stand	Vigour	Leaf-roll	Mosaic	No. of plots	Yield Pounds per rod
(a) Nebraska-Bermuda	94	90	1.3	screened	2	43.8
(c) Montana-Wisconsin-Bermuda	90	97	0	"	2	42.4
(d) Wisconsin-Bermuda	86	92	0	"	2	41.4

Some samples of seed from Nova Scotia, New Brunswick and North Dakota were tested.

In the Spring of 1927 three strains were planted for the Department at Water Mill, Long Island. Following is a summary of the field report.

Strain	Mosaic	Other virus disease	Vigour and growth
(a) Maine, Sands	25.4	0	Fairly good
(b) Nebraska	0	0	Very good
(c) Wisconsin, Radcliffe	60.5	0	Poor

The strain (c) was commercially planted in Long Island for export to Bermuda, and the average percentages in the fifty-seven fields inspected were, leaf-roll, 0.02, and mosaic, 51.2.

Seed for the above was planted on 29th and 30th September, and the following field observations were made on 18th November.

Strain	Stand	Vigour	Leaf-roll	Mosaic	No. of plots
(a) Maine-Long Island	87	85	10.8	.6	5
(b) Nebraska-Long Island	86	90	.7	1.1	20
(c) Wisconsin-Long Island	86	75	.7	35.6	20

GARNETS.—In the summer of 1926 the Garnet fields in Nova Scotia were inspected in the company of Mr. W. K. McCulloch, District Inspector. A full report was submitted immediately on the Director's return. In the accepted fields, leaf-roll was below 1%, with an average of 0.1%. Under the guidance of Mr. McCulloch the growers are becoming experienced in the production of certified seed of merit.

Seven strains were planted at the Station. Leaf-roll was present with a maximum of 1.57% and an average of .26%. The yields ran from 75.4 pounds per rod to 86.3 pounds, with an average of 80.8 pounds.

Samples of Garnets from Prince Edward Island were tested.

Irish Cobblers.—Strains from Nova Scotia and Vermont were tested. The stocks imported commercially, 570 barrels, were practically free from leaf-roll and mosaic. The yields averaged 74.8 pounds per rod. Bermuda-grown seed planted on 9th September was severely injured by wind and drought, and the yield was very small.

Resistence to Wind Injury.—The high wind of 19th to 21st December (maximum velocity 51 miles) brought clearly to notice the fact that healthy plants are more highly resistant to wind injury than are mosaic plants.

Fertilizer Tests.—The second season's comparative test of a complete potato manure sold locally and castor meal or pomace again showed the greater value of the later.

Storage of Bermuda-Grown Seed Potatoes.—Very little loss from rot or attacks of mealy bug was occasioned in Bermuda-grown seed potatoes held in storage. The vines were regularly dusted with lime-arsenate dust, dug before maturity, picked up as dug, and stored in onion crates stacked under fiddlewoods. Loss by rot amounted to 3%.

Other references to potatoes will be found elsewhere in this report.

Vegetables.—Vegetables were planted in the South Field, which had been manured with a green leguminous crop and a light dressing of barnyard manure. In all 323 samples of seed were planted.

Germination of Seeds.—Under the provisions of the Agricultural Inspection Act, 161 samples of seed were tested for viability and trueness to type. With respect to the former, 75% germinated satisfactorily, 19% germinated poorly, and 6% failed to germinate. Most of the samples were reasonably true to type.

Export Vegetables.—Samples of all export vegetables were grown. Early Flat Egyptian beet and Chantenay carrot are highly suitable varieties, for both are early to mature and under proper conditions do not grow excessive tops. Many farmers use fertilisers too freely on their root crops, and thus grow too much top. Nitrate of soda should seldom, if ever, be used, and castor pomace in moderation. The Jersey Island Sunset tomato, which gave promise of suitability for the export trade, under general farm conditions produced fruit too small for export.

Domestic Vegetables.—Though a large variety of vegetables may be grown for local sale and use, the demand is largely restricted to a small selection. Very good results were obtained with a new variety of bush bean, Tennessee Green Pod.

SUMMER VEGETABLES.—Land is too restricted in area to permit work being done with summer vegetables.

Onions.—A small sowing of seed was made on 11th October, 1926. The seedlings were not transplanted, and were thinned on 11th February and harvested on 23rd May. Two hundred bulbs were pulled at random, weighed and scored. The term "marketable" was very strictly interpreted. The yields were small.

(a)	California	53%	44%	3%	2.6 oz.
(b)	Teneriffe, A	59	39	2	1.8 "
(c)	Teneriffe, B	71	28.5	.5	1.5 "

In the Autumn of 1927 was planted a sample of seed grown for the Department in California from Bermuda-grown bulbs. The seed germinated exceedingly well, and was the most vigourous of the five strains scored. See "Onion" on a following page.

Fodders.—The following annual fodder grasses were planted on 17th March, and were cut twice or more: Feterita, milo, shallu, Sudan grass, teosinte and Texas ribbon-grass. Of these teosinte was the most succulent and gave the highest yield, 70 pounds per rod at first cutting. Of the corn (maize), Longfellow and Reid's Yellow Dent gave the best yields. Neither of these varieties should be planted for fodder, however, but the more leafy varieties which have been developed in the United States for silage rather than for grain. Soy beans were fed to the stock and were greatly relished, in contrast to cowpeas. Rape does not appear to be a suitable spring-sown fodder crop for Bermuda. Mangels gave a fair yield.

Green Manuring.—As is customary, most of the arable land was planted to cowpeas and soy beans, and the following yields obtained:

Cowpeas at the rate of from 5½ tons to 6½ tons per acre.

Soy beans at the rate of from 8 tons to 9½ tons per acre. The crop was scythed before being weighed, and the weight of the roots was not included. Because the soy bean better withstands drought, is eagerly eaten by all farm live stock and is more easily ploughed under as a green manure, this legume is better suited to local conditions than is the cowpea. Mammoth yellow is the variety recommended. A further test was made of the mat bean (**Phaseolus aconitifolius**). It does not appear to be adapted to Bermuda.

Adco Synthetic Manure.—In a small test with potatoes, Adco synthetic manure gave a very much larger yield of tubers than did pig manure.

Live Stock.—The Station live stock consisted within the year of the following animals.

GUERNSEY CATTLE.

Montrose Sovereign (106389); sire, Albamont Sovereign; dam, Dora of Atwood's Dairy; born 6th January, 1922. (at Agricultural Station); breeder, J. C. Haartz, Campton, N.H.

Albamont Argonaut (88459); sire, Cramond Defiance; dam; Albamont Forget-me-not; born 31st December, 1922; breeder, A. M. Haartz, Campton, N.H.

Montrose Warrior (120542); sire, Albamont Argonaut; dam, Dora of Atwood's Dairy; born 22nd January, 1926; breeder, Department of Agriculture.

Pioneer President; sire, Uncle Sam of Somerville; dam, Pioneer Daisy III; born 5th October, 1926; breeder, B. C. C. Outerbridge, Smiths, Berda.

Pioneer King; sire, Uncle Sam of Somerville; dam, Albamont Sequel's Daisy; born 8th October, 1926; breeder, B. C. C. Outerbridge.

Montrose Jason (129177); sire, Albamont Argonaut; dam, Albamont Juliet; born 31st October, 1926; breeder, Department of Agriculture.

Montrose Hector (143022); sire, Albamont Argonaut; dam, Dora of Atwood's Dairy; born 24th January, 1927; breeder, Department of Agriculture.

Dora of Atwood's Dairy (73697); sire, Jethro's Squire of Maple Ranch; dam, Idol's Ellen; born 7th January, 1917; breeder, Est. of John Hopewell, Natick, Mass.

Albamont Juliet (85736); sire, Deanie's May King; dam, Juliana of Gerar; born 20th April, 1918; breeder, J. C. Haartz, Campton, N.H.

Juliana of Montrose (203737); sire, Montrose Sovereign; dam, Albamont Juliet; born 1st November, 1925; breeder, Department of Agriculture.

Berkshire Pigs.

Highwood Model 209th, (332648), male; sire, Highwood Model 139th; dam, Highwood Duchess 224th; born 6th November, 1924; breeders, H. C. and H. B. Harpending, Dundee, N.Y.

Highwood Starlight 282nd and 283rd, (332649) and (332650), two females; sire, Highwood Model 190th; dam, Highwood Starlight 250th; born 6th May, 1925; breeders, H. C. and H. B. Harpending, Dundee, N.Y.

Piglets of the above sows.

Toggenburg Goats.

Mayfly of Lorraine, (18970), male; sire, Steven's Antonio; dam, Ace's Maytime; born, 10th March, 1922; breeder, S. F. Cowling, Middlestown, Va., U.S.A.

Arrowhead (T. T. 201) sire, Ace's Arrow No. 4641; dam, J. T. H. 10, Breeder, T. D. John, Beltsville, Md., U.S.A.

Nancy (J.T.H. No. 2); sire, El Chivat's Uncas 11; dam, U.S.D.A. No. 199; breeders, United States Department of Agriculture.

Nan and Nora; sire, 15/16 Toggenburg; dam, Nancy; born 26th April, 1925 (at Agricultural Station); breeders, United States Department of Agriculture.

Female kids of Nan and Nancy and a pair of kids of Nancy, all sired by Mayfly.

Four young bulls were sold, namely, Montrose Warrior to Mr. J. R. Finlay, Somerset; Pioneer President to Mr. G. W. Fisher, Devonshire; Pioneer King to Mr. A. Teceira, Jr., Southampton; and Montrose Jason to Mr. Joseph Aubrey, Crawl. Montrose Sovereign continues to be a large rugged animal, slow in action. He made 113

services during the year. On 24th January Dora dropped a pair of calves sired by Albamont Argonaut. The heifer was sold to the butcher, and the bull (Montrose Hector) was raised. On 1st March Juliet dropped a heifer calf which was not considered worthy to be raised. Two adult animals were sold: Albamont Argonaut which had become unfit for service at five years, and Dora, always rather unthrifty and a slow breeder, and nearly eleven years old. Juliana was due to calf early in January, 1928, and gave promise of becoming a fine cow.

The boar, Highwood Model 209th, made forty services during the year. His usefulness was restricted because of his large size, and late in the year a young boar, Highwood Model 232nd, was purchased. Both sows died, one in January because of shock at farrowing, and the other near the close of the year. Five piglets were sold when about six weeks of age.

The Toggenburg buck, Mayfly of Lorraine, was injured by dogs early in the year, but recovered. He made fifteen services. Anticipating his death, a second buck Arrowhead, was purchased. This buck stood for service in Pembroke for ten weeks. The young stock, namely, Nan, Nora and four kids, were sold for breeding purposes.

During the summer months green fodder was fed to the stock, and a saving effected in feed bills. On the recommendation of the Bureau of Animal Industry, Washington, sprouted oats were fed to the bulls with good results. The sprouter imported for the purpose was quite satisfactory. Home-made sprouters from kerosene tins were also satisfactory. Oat sprouters should be kept very clean and frequently disinfected during the summer.

Disposal of Milk and Vegetables.—Surplus milk and vegetables were given to the Hospital and other institutions, and issued to the Staff. Information regarding the value of produce disposed of will be found in Appendix B.

Fruit.—The citrus trees fruited very sparcely, in marked contrast to their behaviour in the preceding year. An old **Cherimoya** in Montrose orchard produced a good crop of excellent fruit. Most of the trees in this long-established orchard have renewed their growth, probably because of the enrichment of the soil by stock pastured on it.

Flower Beds, Lawns, Greenhouses, &c.—These were maintained in fair order. Flower beds were added to, and the annual flowers in bloom during the year exceeded previous year's. In the autumn seed was purchased from Messrs. W. W. Johnson & Son, Boston, England, and this moderate-priced seed germinated unusually well. Little use was made of the greenhouses because of the lack of a trained gardener. English roses planted on 31st December, 1924, have "run out" and should be replaced. A useful flowering shrub, **Cassia splendens,** was grown from seed donated by Miss Jackson, Devonshire. It is a continuous bloomer.

Plants for Distribution.—Nearly all surplus vegetable seedlings were sold at nominal prices. A small number of trees and

shrubs were sold. At the close of the year the moderate number on hand needed attention. Lack of planting space restricted the work, and here, too, the need of a gardener was felt.

Repairs and Extensions.—Repairs and renewals were made to buildings and fences. A-shaped houses were made for pigs and goats. A concrete boar pen and manure pit was nearly completed. A vegetable (Exhibition) shed was built. The Exhibition stalls were roofed, and other improvements effected in connection with the Exhibition. Three pastures and Montrose orchard were fenced. Increased water catchment is urgently needed, for the large tanks (about 60,000 gallons capacity) are seldom more than one-fourth full. Better stabling and a cottage for the cattleman are much needed. The greenhouses are in need of repair, and the stone Exhibition building leaks badly.

Prison Labour.—The prison labour gang, from eight to fourteen men, was employed at the Station for about 100 days, chiefly during the first part of the year. It was engaged mainly in constructing the new drive, removing out-cropping stone in the south-east pasture, lime-washing stables, and in work connected with the Exhibition.

Office Work.—During the year 1,322 letters were received and 1,694 despatched. The routine work of the office was satisfactorily performed. Additional work included the editing of the Flower Garden Calendar, preparation of Bulletin, Insects of Bermuda and Leaflet No. 11 Report of Potato Work. Eighteen meetings of the Board were held. The clerical work of the Exhibition (4,208 entries) was performed with extra assistance costing £42. 5. 8.

Agricultural Registers.—The revision of the Department's parish registers was begun in 1926. A summary of the information obtained is presented in Appendix C.

Publications Received.—Acknowledgment is gratefully made of the many valuable agricultural publications received from agricultural departments, stations, colleges and other bodies.

Publications Issued.—The following were printed: 3,000 copies of The Garden Calendar; 600 copies of Report of Potato Work, 1927; 200 copies (mimeographed) of Summary of the Chief Diseases and Pests of the Easter Lily and Control; and 300 copies (mimeographed) of Cultural Notes for the Bermuda Easter Lily; also the following annual publications, 600 monthly copies of Agricultural Bulletin, 500 copies Annual Report for 1926, and 700 copies of Catalogue of the Exhibition. A number of articles by the Plant Pathologist appeared in English and American scientific and trade papers, and are referred to by that officer.

Visitors.—Visitors at the Station included their Excellencies General Sir J. J. Asser and Lieut.-General Sir L. J. Bols, and Dr. E. L. Mark, Mr. James Boyd, President of the Pennsylvania Horticulturist Society, Mr. Frederick R. Newbold, Secretary of the Horticultural Society of New York, Miss Faith Fyles of the Division of Horticulture, Ottawa, Mr. Geddes Grant of Trinidad and Mr. H. K. Lewcock, Mycologist to the Commonwealth (Australian) Prickly Pear Board.

Rainfall.—It is not possible to publish the rainfall at the Station, but in Appendix D will be found the record taken at Prospect by the Royal Army Medical Corps.

AGRICULTURE IN 1927.

The year under report was one unfavourable to Bermuda agriculture. The quantity of produce exported was below the average of recent years, and prices were for the most part low. The slump in potato prices near the close of the Triumph season was the most disturbing feature of the year, and low prices for lily bulbs brought disappointment to the growers. The bright spots were the size and quality of the celery crop, the high prices for which some Garnets sold, and the marked increase in tomato exports.

The quantities of potatoes, onions and other vegetables exported during the last ten years were as follows:—

1918	382,325	bushels
1919	538,126	"
1920	513,938	"
1921	470,225	"
1922	379,082	"
1923	318,761	"
1924	416,604	"
1925	313,280	"
1926	426,896	"
1927	371,887	"

The quantity exported in 1927 was 87 per cent of the previous year's exports, and 98 per cent of the average of the last decade.

The **gross** value of the exported crop (exclusive of lily buds) was as follows:—

To the United States of America.

Beets, 11,366 crates @ $1.16	$ 13,182	
Carrots, 44,833 crates @ $1.50	67,553	
Celery, 54,651 crates @ $5.32	290,861	
Kale, 7,773 crates @ $5.00	38,865	
Lettuce, 1,168 crates @ .99	1,156	
Onions, 10,486 crates @ $2.52	26,425	
Parsley, 55,619 crates @ $1.56	87,139	
Potatoes, 34,670 barrels @ $10.31	357,452	
Turnips, 760 crates @ $1.67	1,276	
Lily bulbs, 5,814 cases @ $12.00	69,768	£198,682

To the Dominion of Canada.

Onions, 8,042 crates @ $2,00	$ 16,084	
Potatoes, 28 barrels @ $6.50	182	
Tomatoes, 16,056 crates @ $1.20	19,267	
Miscellaneous vegetables, 1,522 crates @ $2.25	3,424	
Lily bulbs, 22 cases @ $12.00	1,464	8,421

To the British West Indies.

Onions, 1,042 crates @ $1.60	$ 1,667	
Potatoes, 1,374 barrels @ $6.00	8,244	
Tomatoes, 132 crates @ $1.60	210	
Miscellaneous vegetables, 309 crates @ $1.72	531	2,219

To Great Britain.

107 cases lily bulbs @ £2. 10. 0	267
	£209,589

The estimated **local** value of all agricultural products is given below:

EXPORTED.

To United States of America	£128,217	
To Dominion of Canada	3,184	
To British West Indies	1,513	
To Great Britain	214	£133,128

CONSUMED LOCALLY.

Potatoes and other vegetables	£ 58,000	
Bananas	18,000	
Milk	67,000	
Eggs and poultry	30,000	
Meat, chiefly pork	18,000	£191,000
Total		£324,128

The above estimate is 106 per cent of that of the previous year, and with respect only to exports 76 per cent.

The average New York prices in 1913 (pre-War) and 1923 to 1927 follow:

	1913	1923	1924	1925	1926	1927
Beets	.97	1.89	1.44	1.32	1.68	1.16
Carrots	.95	1.83	1.67	1.29	1.70	1.50
Celery	3.40	6.66	7.44	2.94	8.25	5.32
Lettuce	1.34	1.34	1.91	1.42	1.43	.99
Onions	1.53	3.04	1.77	3.02	1.95	2.52
Parsley	1.07	1.88	4.90	1.45	1.95	1.56
Potatoes	5.97	12.97	13.00	14.00	14.75	10.31

In order that the relative pre-War and present-day costs of production may be intelligently considered, the prices of the principal farm supplies and services in 1913 and 1927 are given below.

	1913	1927
Rent, estimated increase	——	12%
Labour, day	4/- to 5/-	9/- to 10/-
Seed potatoes, Triumphs, barrel	19/-	35/-
Garnets, "	13/-	30/-
Fertilizer, Castor pomace, 100 lb bag	5/6	6/6
Horse manure, cart-load	4/-	8/-
Spraying material, lime, bushel	10d.	1/6
blue stone, lb.	4d.	5d.
Containers, barrels, each	1/6	3/6
crates, vegetable, each	6d.	1/1
" celery, each	10d.	1/4
nails, 100 lbs.	13/-	24/-
Freight to New York, potatoes bbl.	50 cents	55 cents
onions, crate	14 "	14 "
green vegetable, crate	25 "	25 "
celery, crate	60 "	60 "
Cartage in New York, barrel	7 "	25 "
crate (bushel)	4 "	10 "
		per lb.
United States import duty, potatoes	free	½ cent
carrots	15% ad valorem	25% a.v.

NOTES ON MARKETING.

Agricultural exports were divided among the four markets in the following approximate proportions: United States, 87%; Canada, 9%; British West Indies, 3%; and Great Britain, .01%. Competition in the United States becomes keener each year, Canada can be considered scarcely better than a potential buyer, prices in the West Indies are not very profitable, as a rule, and the English market is far distant and interested at the present in but one Bermuda product.

Co-operation, which has solved many another agricultural marketing problem, has offered, of late, little relief in Bermuda. Undoubtedly, lack of education handicaps many, and until the majority of Bermuda farmers are educated and independent-minded, local agriculture will languish whatever the props placed under it.

During the year under report marketing matters continued to receive attention.

Representative in New York.—In view of the retirement on 31st January of Mr. G. E. Winter, Inspector of Produce, that officer was sent to New York in the new year to instruct Mr. T. A. Hollis, Jr., a Sub-Inspector. Mr. Hollis continued in New York throughout the greater part of the season, and made a creditable beginning. That the Department's representative gives valuable service in New York is evident from the interest taken in his movements by the shippers.

Advertising Bulbs in England.—The system of advertising Bermuda Easter lily bulbs in England arranged and put into effect in 1926 by Messrs. Pratt & Co., (Advertising) Ltd., London, and referred to in last year's report, should develop in the British Isles a stronger demand for our bulbs, particularly when their excellent quality is more widely known. Unfortunately, the immediate benefits of the scheme were reduced by the delay and damage in transit of the bulbs shipped as prizes. However, as most of the participants are prepared to remain in the scheme and new ones are being added, it would appear that the injurious effects of the accident were not lasting, and that considerable publicity was given to Bermuda bulbs at relatively little expense. The total cost for the year was £22. 18. 3.

Advertising Bulbs in the United States.—The sum of £200, referred to in last year's report, voted for a co-operative scheme of advertising Bermuda Easter lily bulbs in the United States, was not spent because of failure on the part of the growers to work together for their mutual interest.

Chill-room Accommodation for Celery.—On three voyages, namely, on 21st and 28th May and 4th June, the chill-rooms of the S.S. "Fort Victoria" were inadequate for celery, and some loss to the growers resulted. The situation is an awkward one, and full credit should be given the Furness Bermuda Line for the service it has furnished, sometimes at a loss to the company.

Adjustment of Freight Rates to New York.—Following changes made by the Board in the sizes of produce crates, representation was made to the Furness Bermuda Line for corresponding adjustments in the freight rates. No adjustment was made in 1927,

but early in the following year. It should be recognized by all interested in agricultural exports that freight rates are now the lowest of all charges on produce, when comparison is made with pre-War charges.

Shipment of Produce to Canada.—Under the terms of the Canada-West Indies Trade Agreement, to enjoy the benefits of the tariff advantages conceded by Canada, Bermuda products must be conveyed without transhipment direct to a Canadian port. The direct service given last year was inadequate, and the discontinuance of the privilege to ship in bond via New York was a keen disappointment to the shippers.

Inspection Regulations.—The revision of Regulations under the provisions of The Agricultural Inspection Act, 1921, bears closely on marketing, and is dealt with elsewhere.

Shipment of Produce Act, 1926.—Regulations under this Act were considerably modified after discussion with the shippers at a meeting held on 20th July. The most important features of the Act and Regulations deal with the licensing and bonding of shippers. Following is a list of licensed shippers:

Bermuda Green Vegetable Growers Association.
J. M. Darrell.
R. Darrell and Company.
Henry Dunkley and Company.
H. G. Hill and Company.
Ingham and Wilkinson.
O. R. Loblein.
John P. Mello.
G. J. Moniz.
H. T. North.
Pearman, Watlington and Company.
J. Perry and Company.
M. F. Simons.
B. W. Walker and Company.
W. A. Young.

Shipment of Sweet Corn to United States.—Modification of Quarantine No. 41 of the Federal Horticultural Board of the United States Department of Agriculture permits the importation of Bermuda sweet corn into the States.

Canadian Quotations.—The Fruit Branch at Ottawa kindly agreed to furnish the Department with cabled information regarding the marketing of Bermuda produce (onions and tomatoes) in Canada. The service should prove useful.

Extension of Markets in United States.—In 1925 and 1926 the sum of £814 was spent in investigating markets outside New York. Valuable information was secured and considerable interest aroused. Trial shipments were made, and it appeared that subsidary markets could be established. However, in 1927 extremely few direct shipments were made outside New York, and it would appear that the advantage created in 1925 and 1926 was to a great extent lost.

THE HOME MARKET.

An increasing quantity of farm produce was consumed locally. It is estimated that the total farm value of farm, garden and back-yard produce was £191,000. Yet very much more produce could and should be grown for local consumption, for the condition governing sales in our principal foreign market should impress on all interested the necessity of giving more thought to the market within the Islands. The majority of farmers would find it profitable to cater more to the needs of their own tables. What was stated in last year's report is repeated, namely, that the home market can be profitably developed far beyond its present proportions by the active and intelligent co-operation of those chiefly interested, namely, farmers, hotel managers and housewives.

The Corporation of Hamilton continued to give the use of Shed No. 6 for the Farmers' Market. As a rule, but one farmer sold therein, though he sold for others. It is considered that the effect of the Market on the retail price of produce was favourable to customers. It may be assumed that provision for a suitable six-days-a-week market would benefit farmers and housewives alike, and consideration is being given to the subject.

POTATOES.

The exports of potatoes during the last ten years were as follows:—

1918	81,158 barrels
1919	87,096 "
1920	58,674 "
1921	58,955 "
1922	41,999 "
1923	33,604 "
1924	35,254 "
1925	23,488 "
1926	34,475 "
1927	36,072 "

The quantity exported in 1927 was 104 per cent of the exports of the previous year, and 68 per cent of the average of the last decade. The average New York price was 70 per cent of that obtained the previous year, and 76 per cent of that of the last four years.

The shipment from Cuba of early potatoes to New York has created a situation unfavourable to Bermuda, though that situation has been modified by Cuba's recent high import duty which has had the effect of restricting her shipments. In 1926 Cuba shipped to New York 40,630 bushels of early potatoes, and in 1927 81,158 bushels. The conditions which now exist call for a change in the method of marketing Bermuda's crop. A small quantity of white (Irish Cobblers) potatoes was shipped to New York, but did not command as good a price as Garnets. As the latter crop more heavily, there appears to be no advantage in growing white-skinned potatoes for export.

Seed for planting in Long Island, New York, to supply Bermuda was purchased from the same source in Wisconsin as in 1925 and 1926, but its percentage of mosaic was very much higher than in

the two preceding years. The report of the field inspection in Long Island, made by Mr. S. E. A. McCallan was presented to the Board. Seed will be obtained next season from a source in Nebraska which has given satisfaction for several years.

Garnet seed from Nova Scotia was remarkably free from leaf-roll when planted in Bermuda in 1926-1927. The seed planted in 1927-1928 gave indications at the time of writing of being slightly inferior, in respect to infestation of leaf-roll, to that planted the previous season. The field report was forwarded to the Department by Mr. W. K. McCullock, District Inspector in Nova Scotia, to whom Bermuda is deeply indebted, and a summary is here presented.

District	Acres Inspected	Acres Accepted	Leaf-roll Highest	Leaf-roll Lowest	Average
Clifton	103.00	91.75	1.0	0	.21
Masstown	20.75	20.25	.66	.33	.38
Windsor	8.75	8.50	.66	0	.11
Cornwallis	62.00	47.00	1.33	0	.56

From correspondence received from Nova Scotia it appears that the growers of certified Garnet seed potatoes are willing to grow the seed under contract, a plan to which a majority of the importers are not yet favourable, though one which the Department has strongly recommended for many years.

GREEN VEGETABLES.

Exports of green vegetables during the last ten years were as follows:—

1918	63,976	bushels
1919	162,517	"
1920	260,784	"
1921	263,649	"
1922	191,806	"
1923	193,974	"
1924	280,745	"
1925	216,891	"
1926	284,135	"
1927	255,765	"

The quantity exported in 1927 was 90 per cent of the quantity exported in 1926, and 120 per cent of the average of the last decade.

The outstanding feature of the year was its large and excellent crop of celery. Weather conditions were highly favourable, for the rainfall was below the average and insufficient for high land crops. Not alone, however, was the large crop due to weather, for the high quality of the seed was undoubtedly an important factor. The history of the selection of celery seed suitable to local conditions is too long to be entered into here, but an important chapter was the Director's visit to France in 1924, when a strain previously imported by a few growers was identified, and subsequent arrangements made with the grower with respect to shipments free from blight infestation.

The increase in tomato exports, due in large measure to the interest taken in the crop by Mr. W. J. H. Trott, M.C.P., has already been alluded to. This vegetable is exported to Canada, and it appears that further expansion may be anticipated if due attention is given to quality, attractive packing and proper marketing methods.

Prices in New York for beets, carrots, lettuce and parsley gave little profit. Following will be found the average New York gross prices and the Bermuda nett farm prices for the last five years (including 1927). In arriving at the nett price, current marketing costs have been taken. The exceptionally high price of parsley in 1924 has been disregarded.

	New York prices, gross	Bermuda prices, nett
Beets	$1.50	3/3
Carrots	1.60	3/1
Lettuce	1.42	2/8
Parsley	1.71	3/4

Whether production costs can be reduced lies ultimately with the farmer. Methods which are recommended as helpful are better business acumen in buying and selling, more effective control of plant diseases and pests, increased cultivation of leguminous green manure crops, ownership of better farm live stock, use of more modern tools and implements, and reduction of family food costs.

Whether high or low production will prove the more profitable cannot be definitely stated. The law of diminishing returns cannot be disregarded, but in this connection some interesting data have been gathered with respect to profits in celery. The few cases studied indicate that high production gives greater profit whatever the price; for example, the farmer who spent £917 per acre, and averaged 900 crates, made a profit in all the years 1924, 1925 and 1926; but he who "economised" and spent but £227 per acre on his average crop of 157 crates made a loss on every crate sold, and an extremely heavy loss in 1925 when prices were low.

Attention should be given to more attractive packages and more honest packing. "Care and skill in harvesting, grading and marketing in an orderly manner will count in favour of the grower." Modern methods in selling the crop should be adopted.

ONIONS.

Exports of onions during the last ten years were as follows:

1918	133,141	bushels
1919	131,271	"
1920	109,072	"
1921	49,455	"
1922	70,874	"
1923	35,176	"
1924	41,848	"
1925	21,170	"
1926	39,336	"
1927	19,930	"

The quantity exported in 1927 was little more than 50 per cent of the quantity exported in 1926, and 26 per cent of the average of the last decade. Onion exports were highest in the ten years ended 1900 when a yearly average of 315,715 crates (or bushels) was reached.

During the year under report, as previously noted, a small quantity of seed produced from selected bulbs sent from Bermuda in 1926 was received from Messrs. Aggeler and Musser, Los Angeles, California. The seed was distributed among seven leading onion growers, and a further selection of bulbs will be made from the plots planted to this seed. In 1927 small samples of selected bulbs were sent the Division of Horticulture, Montana, and to a New York seed-house for experimentation.

Canada appears to be our future market for onions, but only mature, cured onions, of good quality are in demand in the Dominion, and a sound marketing system is essential.

BERMUDA EASTER LILIES.

Export of Bermuda Easter Lily bulbs during the last ten years, according to Customs returns, were as follows:

1918	823	cases
1919	664	"
1920	749	"
1921	936	"
1922	1,604	"
1923	3,116	"
1924	3,539	"
1925	4,040	"
1926	4,524	"
1927	6,043	"

The quality of the bulbs was better than ever before. Reference to the subject will be found in the report of the Plant Pathologist to whom the growers are heavily indebted for instruction in the improvement of their bulbs. During the year arrangements were entered into with institutions in the United States of America, our principal bulb market, by which the behaviour of our bulbs is being studied under greenhouse conditions. The investigation is referred to by the Plant Pathologist.

It is regrettable that the price of Bermuda bulbs has not kept pace with their quality. The contrary has taken place, and this situation has been brought about entirely by Bermuda growers and shippers, for the demand has been good, especially in 1927. Lack of co-operative action and the fear that stocks would be left on hand created a condition favourable to buyers. A co-operative scheme submitted by a grower-shipper was not acceptable to the majority. It is evident that some form of co-operation must exist among the growers if profitable prices are to be maintained and selling costs reduced to a reasonable level.

ASSISTANCE TO FRUIT GROWING.

Some interest in fruit growing can be reported. During the year the Department imported for various individuals about two

hundred fruit trees, chiefly citrus. The control of pests and diseases is more intelligently understood and there exists no great obstacle to fruit growing on a small scale.

CONTROL OF PLANT DISEASES AND PESTS.

This subject is dealt with in the report of the Plant Pathologist, Mr. Lawrence Ogilvie, whose studies of the diseases and pests of Bermuda plants, particularly those of economic value, have greatly benefitted agriculture and horticulture. The Pathologist's work in the control of Easter lily diseases and pests is deserving of special mention, and at the time of writing, when he is resigning from the Department to take the post of Adviser in Economic Mycology for the Bristol Province, England, under the Advisory scheme of the Ministry of Agriculture and Fisheries, Mr. Ogilvie has the satisfaction of knowing that through his instructions to them the growers of lilies are for the most part familiar with the enemies of their crop and methods of control, and that with respect to freedom from disease and trueness to type the crop has reached a degree of perfection never attained before.

Possibly some improvement can be reported in the use of control measures of other crops, but more complete control is highly desirable.

The two Friend motor spraying pumps, purchased in 1921 for the control of oleander scale, were hired 55½ days during the year, chiefly to spray potatoes and lilies. As a means of more quickly introducing dusting, six Niagara blower dust guns, purchased late in 1926, were for hire at three shillings per day, but it is regretted that little use was made of them. Representation was made to the largest exporters of dust to Bermuda, and on the advice of Professor H. H. Whetzel, a special insecticide and fungicide dust was compounded for use here, and gave satisfaction. On the Station crops insecticides and fungicides are generally applied in the form of dusts, and good results are obtained. Liquid sprays are seldom used except to control scale insects. Dusting is strongly recommended.

Loss from common potato scab is negligable at the Station, and its absence is due, probably, to the almost invariable scale of ploughing under green manure and soaking the seed in formalin solution.

INSPECTION AND REGULATORY SERVICES.

The inspection services of the Department relate to the following:

(1) **Contagious Animal Diseases.**—All imported domestic animals are subject to inspection on arrival. Stocks of anti-hog-cholera serum and tubercular vaccine are kept on hand in case of need. Late in the year sickness occurred among pigs on the southern part of the Island where the boundaries of Paget and Warwick meet. The matter was investigated by the Government Veterinary Officer. Three cows were slaughtered because of tuberculosis. No serious outbreak of contagious animal disease occurred.

(2) **Produce Exported.**—Regulations dealing with the inspection of produce, namely, potatoes, onions and other vegetables,

were amended at length, the most important amendments being those dealing with the inspection of tomatoes and of box material. The latter feature, in particular, should greatly benefit farmers.

(3) **Seed Potatoes Imported.**—The importers of seed potatoes must satisfy the Director that the potatoes are certified stock and likely to be satisfactory in other respects.

(4) **Bulbs and Nursery Stock both Imported and Exported.**—This is dealt with by the Plant Pathologist. Granulated peat moss was added to the packing materials for lily bulbs.

(5) **Vegetable Seed Imported for Sale.**—Samples of vegetable seeds numbering 161 were tested for viability. As already stated, on the whole the seed was satisfactory. The Plant Pathologist deals with the inspection of celery seed with reference to blight infestation.

The following firms were licensed as seedsmen:

Bermuda Green Vegetable Growers Association.
Fairy Isle Flower Shop.
W. R. Darrell.
H. G. Hill and Co.
O. R. Loblein.
G. J. Moniz.
E. S. Outerbridge.
E. W. Outerbridge Co.
J. H. P. Patterson.
Peniston and Curtis.
A. J. Saintes.
L. N. Tucker.
T. J. Wadson and Son.

(6) **Shipment of Produce Act, 1926.**—Dealt with under Marketing Notes.

(7) **Control of Local Plant Diseases and Pests.**—Regulations relating thereto remain in force.

Conditions under which Plants may be Imported.—All living plants and parts thereof (except seeds) intended for planting, bananas and citrus fruits are subject to inspection at the dock or Post Office, according to the manner of importation. No permits to import are required, except for seed potatoes.

Prohibited Plants.—The following plants and parts thereof are prohibited:

(a) Banana plants and parts thereof, except fruit.
(b) Antirrhinum or snapdragon plants.
(c) Citrus plants and citrus fruits (unless the latter are free from leaves and portions of the plants) imported from the West Indies and the Bahamas.
(d) Irish potatoes from Great Britain and Ireland, the countries of Europe, Newfoundland and the islands of St. Pierre and Miquelon, and Chili Garnet and Bliss Triumph potatoes from all sources unless conforming to seed potato regulations.
(e) Sweet potatoes from the United States of America, Cuba, the Bahamas, British Guiana, Jamaica, the Canal Zone and Porto Rico.
(f) Carrots in their raw or untreated state.
(g) Narcissus and Lilium bulbs.
(h) Indian corn or maize in the ear, broom corn and other sorghums and sugar cane in the raw or untreated state.

FARM LIVE STOCK.

Some improvement can be reported in the quality of farm live stock, particularly dairy cattle. The good effects of the Department's registered animals in grading up stock is apparent, especially at the cattle show at the Agricultural Exhibitions. The high cost of labour and feed combine to influence dairymen to import better animals than formerly. The shipment to Bermuda of heavy-in-calf cows was enquired into, but no action was taken.

The Colony's participation in the World's Poultry Congress at Ottawa caused local poultry-keeping to receive increased attention. The Department, through Mr. W. R. Evans, the First Agricultural Assistant, gave not inconsiderable assistance to poultrymen during the year under report, for example, 350 head of breeding stock were imported through the Department. The members of the Bermuda Poultry and Pet Stock Association are to be congratulated on the excellent show held on 27th and 28th January, and on the continued activity of the Association.

WORLD'S POULTRY CONGRESS.

Mr. W. R. Evans, First Agricultural Assistant, was one of the Colony's official delegates to the Third World's Poultry Congress held at Ottawa from 24th July to 3rd August. His report was presented on his return, and a summary of it will be found on another page.

THIRD EGG-LAYING CONTEST.

The Department is greatly indebted to Mr. L. W. Howarth for his generosity in operating on his farm the third Bermuda Egg-laying Contest. The contest is reported on by Mr. Evans.

ANNUAL AGRICULTURAL EXHIBITION.

The Annual Agricultural Exhibition of 1927 was held on 27th, 28th and 29th April. In many respects it was a larger and better show than any of its predecessors, and the interest taken in it by the community at large was very pleasing. The Department is deeply indebted to all who assisted.

For the first time it was found necessary to apply to the Legislature for a supplementary grant, for the expenditure exceeded the receipts. A sum in excess of the deficit was granted, and a vegetable shed was built, the horse (and cattle) stalls roofed and additional poultry cages purchased.

The growth of the Exhibition is shown by the following comparison with the show held the previous year and in 1922, the latter being the first held after the Great War.

COMPARISONS OF ENTRIES AND ATTENDANCES, 1922, 1926 AND 1927

Number of Entries:	1922	1926	1927
Horses	86	87	132
Cattle	46	91	74
Pigs	2	11	12
Goats	25	22	24
Rabbits	13	42	96
Poultry	37	245	289
Dogs	43	35	61
Vegetables	88	686	560
Fruits	9	86	38
Flowers	181	790	929
Food Products	136	691	615
Arts and Crafts	291	1,153	1,378
Miscellaneous	7	—	—
	964	3,939	4,208
Days open	2	3	3
Estimated number present	7,300	11,000	13,000

Statement of Receipts and Expenditure, 1926 and 1927.

Receipts

	1926	1927
Balance brought forward	£ 77 16 0	£ 1 9 11
Granted by Appropriation Acts	300 0 0	300 0 0
Granted by Resolve No. 15 of 1927		140 0 0
Donated by Trade Development Board	37 18 8	37 18 8
Donated by sundry persons for prizes	21 4 4	12 14 0
Gross receipts for catalogue and other advertisements	129 12 0	137 11 11
Ground rents	49 0 0	68 15 0
Entry fees	31 7 6	38 17 6
Gate receipts	306 0 4	377 15 8
Enclosure receipts	73 7 8	104 15 8
Unpaid adult prize money	4 13 6	15 8 6
Sundry	5 15 8	8 0 8
	£1,036 15 8	£1,243 7 6

Expenditure:

Prizes to adults	£ 389 6 4	£ 402 17 6
Prizes to Agricultural Clubs	100 5 0	120 17 6
Prizes for sports	19 15 6	24 16 0
Advertising	30 18 1	35 5 5
Catalogues, &c., printing and commission on advertisements	87 2 11	111 8 0
Stationery and printing	29 3 7	51 7 6
Lumber	63 10 11	79 18 8
Other material	54 5 10	128 7 2
Band	50 0 0	50 0 0
Carriage and teas for band and others	19 1 9	14 3 1
Carriage of exhibits	10 6 0	7 16 0
Labour, field, including over-time	63 2 5	72 2 0
Watchmen	5 10 0	7 0 0
Gate-keepers	30 0 0	30 0 0
Clerical	39 17 10	42 5 8
Carried forward	£ 992 6 2	£1,178 4 6

	1926	1927
Brought forward	£ 992 6 2	£1,178 4 6
Police	4 0 0	5 0 0
Cartage	16 10 6	15 6 6
Depreciation, rental, &c., of Government stores	15 15 7	26 3 1
Light, telephone and miscellaneous	6 13 6	17 1 2
Balance	1 9 11	1 12 3
	£1,036 15 8	£1,243 7 6

DONORS AND WINNERS OF SPECIAL ADULT PRIZES.

His Excellency, General Sir J. J. Asser, silver challenge cup for Parish showing most marked improvement over its record of previous year, Hamilton Parish; held by Dr. R. L. Tucker.

Messrs. James Carter and Co., Raynes Park, England, silver challenge cup for best collection of vegetables and flowers (six of each) grown from firm's seeds, no competition.

J. Roosevelt-Roosevelt, Esq., five pounds for highest number of points for export vegetables, Mr. W. A. Young, Pembroke.

Freer Cox, Esq., two pounds and one pound for best cared for hack horse from stable of not more than four horses, Mr. Arnold Hurst and Mr. Rupert Roberts, Pembroke. (S.P.C.A. competitor.)

John Trimingham, Esq., two pounds for best trolley horse from stable of not more than three horses, Mr. Fred Smith, Pembroke.

The steady growth of the Exhibition, the increasing support of the community, the improvement of the quality of the exhibits and the examplary deportment of those who attend all attest to its great value to the community. It has stimulated agriculture and many other local interests. It is of greatest value in its relation to the youth of the Colony.

BOYS' AND GIRLS' AGRICULTURAL CLUBS.

Agricultural Club work centered around the Agricultural Exhibition. The interest taken by Club members and the quality of their exhibits were in advance of last year's records. Many liberal prizes were donated, and these encouraged the competitors.

Following is a list of the donors and winners of special Club prizes:

His Excellency, General Sir J. J. Asser, silver presentation cup for largest number of points won by girl for exhibit of flowers, Barbara Hollis, Bermuda High School for Girls.

His Excellency, General Sir J. J. Asser, silver presentation cup for largest number of points won by boy for exhibit of vegetables, Harry Garcia, Whitney Institute School.

Bermuda Rotary Club bronze challenge shield for Club winning highest number of points, Bermuda High School for Girls. (Third time, it is now property of school.)

W. J. H. Trott, Esq., M.C.P., silver challenge cup for Club showing most marked improvement over its record of previous year, St. George's Grammar School.

Hon. J. P. Hand, C.M.G., M.B.E., M.C.P., gold medal to member of Woodlands School Club winning largest number of points, Eldon Belvin.

Hon. J. P. Hand, C.M.G., M.B.E., M.C.P., silver medal to member of Greenfield School winning largest number of points, Lucille Da Costa de Silva.

Mrs. James A. Conyers, ten shillings each for best plain sewing by girl between ten and twelve years of age and girl less than eight, Marjorie Smith, Whitney Institute School, and Dorothy Tuckett, St. Mark's School.
An additional prize of ten shillings was won by Ethol Marshall (under ten), Whitney Institute.

William Murphy, Esq., ten shillings for best laundered work, Anita Rowling, Paget Glebe School.

W. R. Perinchief, Esq., ten shillings to member of St. George's High School Club winning largest number of points, Robert Perinchief.

Mrs. Sinclair Kennedy, ten shillings for annual chrysanthemums, Bertie Walker, St. George's Grammar School Club.

Corn Contest silver challenge cups were won as follows:

Bermuda Green Vegetable Growers' Association cup for best ten ears of corn grown by a boy, Edward Hall, Warwick Academy Club.

Hon. W. E. Jackson's cup for best ten ears of corn grown by a girl, Edna Hall, Greenfield School Club.

Hon. J. P. Hand's cup for largest yield, won jointly by Edna and Edward Hall.

In addition, cash prizes to the value of £4. 11. 0. were awarded to twelve members representing eight Clubs.

As the interest in the corn contests is now so low, the Board has decided to ask the donors of the challenge cups to transfer them to vegetable contests in connection with the Annual Agricultural Exhibition.

VISITS TO FARMS, MEETINGS, ETC.

No less than 1,258 recorded visits were paid to farms, gardens and schools by members of the Department. This number is 113 per cent of the average of the previous three years.

Parish	Director	Pathologist	Assistant	I.P.	G.V.O.	Total
St. George's	14	46	nil	39	11	110
Hamilton	17	32	29	38	7	123
Smiths	24	50	51	33	18	176
Devonshire	29	64	28	36	8	165
Pembroke	15	64	52	39	28	198
Paget	35	111	41	29	21	237
Warwick	21	22	61	14	14	132
Southampton	20	13	28	6	3	70
Sandys	8	11	28	–	–	47
	183	413	318	234	110	1,258

Meetings of lily growers were held, a meeting of celery growers and shippers and a meeting of seed potato importers. Members of the Department addressed horticultural and other meetings. An exhibit of varied nature attracted attention at the Somerset Flower Show. Schools were addressed.

DIRECTOR'S VISIT TO UNITED STATES.

Full reports were presented at the time of the Director's visit on official business to the United States of America in May and June and again in December. The matters enquired into are, for the most part, referred to in this report.

BOTANIC GARDENS.

The first step towards the establishment of a Botanic Garden in connection with the Agricultural Station was the action of the Legislature in granting for the year 1928 the sum of £500 for the employment of a trained Horticulturist and contingent expenses. The matter was referred to at some length in last year's report, and it is sufficient to state at this time that next year should see the work in hand.

STAFF.

Mr. E. A. McCallan, Director of Agriculture, was absent on duty in the United States of America from 28th May to 13th June, and from 27th December to 2nd January, 1928. He was appointed a Trustee of the Bermuda Biological Station.

Mr. Lawrence Ogilvie, Plant Pathologist, was absent from 24th December, 1926, to 7th January, 1927, to attend the Annual Conference of the American Phytopathological Society at Philadelphia. Mr. Ogilvie acted as Officer-in-Charge during the absence of the Director.

Mr. G. E. Winter, Inspector of Produce, was absent on duty in New York from 8th January to 4th February for the purpose of instructing Mr. T. A. Hollis, Jr., Sub-Inspector, who succeeded him as the Board's representative in New York. On 31st January Mr. Winter retired from the public service after fifteen years' service in the Department and forty-one in the employ of the Government. By Mr. Winter's retirement the farmers of Bermuda lost a friend, and the Department an efficient and loyal member.

Mr. W. R. Evans, First Agricultural Assistant, was on sick leave from 15th February to 14th March. He was absent from the Colony from 12th July to 11th September to officially attend the World's Poultry Conference, Ottawa.

Mr. G. L. Young, Clerk, was absent on leave from 1st July to 31st August. His duties were performed by Mrs. Ada M. Spershott.

Mr. E. L. Adams, Assistant Inspector of Produce, was appointed Inspector on the retirement of Mr. Winter.

Mr. T. A. Hollis, Jr., Sub-Inspector, was appointed Assistant Inspector on the promotion of Mr. Adams on 1st February. He was on duty in New York from 8th January to 22nd April and from 14th May to 20th June.

FINANCIAL.

The expenditure of £4,865. 0. 0. was authorized by the Appropriation Act of 1926 and Resolve 15 of 1927. The sum of £4,560. 15. 5. was expended, and a balance of £304. 4. 7. remained at the close of the year. The sum of £346. 2. 4. was received from sales of vegetables and other sources, and was reimbursed to the Treasury. Produce of the value of £159. 3. 5. was supplied to Government and other institutions. Details of expenditure and receipts will be found in the Appendices.

During the last ten years the expenditure by the Department, exclusive of salaries, and receipts have been as follows:

Year	Expenditure	Receipts
1918	£2,051 8 0	£376 3 4
1919	2,722 5 8	157 18 0
1920	3,126 6 6	209 4 6
1921	5,488 15 2	176 1 11
1922	6,905 18 2	68 17 4
1923	4,163 6 10	73 0 11
1924	4,515 10 8	182 19 3
1925	4,851 16 7	129 18 9
1926	5,169 6 5	207 8 9
1927	4,560 15 5	346 2 4

Respectfully submitted,

E. A. McCALLAN,

Director of Agriculture.

Agricultural Station, Bermuda.
19th March, 1928.

Report of the Plant Pathologist for the Year 1927

Director of Agriculture,

The following report is of investigations carried out during 1927 and in 1928 up to the time of my departure for England to take up the post of Advisory Mycologist at Long Ashton, Bristol.

PUBLICATIONS.

1. An account of the "Insects of Bermuda," with historical and biological notes, has been compiled and will be published by the Department. Though this catalogue is probably far from complete, it is thought that the groups of economic importance are fairly well represented.

2. A list of diseases of crop and ornamental plants in Bermuda is in course of preparation.

3. A short description of 'yellow flat,' "An important disease of **Lilium longiflorum** and its varieties," was published in "Nature" (Vol. 119, No. 2997, Apr. 9, 1927, p. 528).

4. A paper on "A transmissable virus disease of the Easter lily" has been prepared for publication in the "Annals of Applied Biology."

5. A preliminary paper on the mosaic disease of lilies is being prepared by Mr. C. E. F. Guterman and the writer.

6. A mimeographed account of the "Diseases and pests of the Bermuda Easter lily" was prepared for the guidance of growers.

7. An article entitled "The resuscitation of the Bermuda Easter Lily" was contributed to the "Florists Review" for 3rd November, 1927, and a somewhat similar article entitled "The Bermuda Easter lily: an important industry in the Empire's oldest self-governing colony" appeared in the "Gardeners' Chronicle."

8. An account of the "Rusts and smuts of Bermuda," by H. H. Whetzel and H. S. Jackson, published in the "Transactions of the British Mycological Society," includes a number of species collected by the writer.

9. Some forty species of **Cercospora** causing leaf-spots were collected during the year, and are being worked up by Dr. Chupp and the writer.

10. Specimens of some sixty other pathogenic fungi were included in the collections of "Bermuda Fungi" in course of preparation by Prof. Whetzel and the writer.

11. A description of "Methods employed in breeding **Opius humilis** Silv., a parasite of the Mediterranean fruit fly (**Ceratitis**

capitata Wied.)" appeared in the "Bulletin of Entomological Research" for February, 1928.

12. An article dealing with "Black tip, a finger-tip disease of the Chinese banana in Bermuda" has been accepted for publication in "Phytopathology."

13. An article on "Notes on the growing of citrus in Bermuda," dealing with all sides of the question, appeared in the "Bermuda Agricultural Bulletin" for November and December, 1927, and February and March, 1928.

14. Among shorter articles prepared for the Agricultural Bulletin in 1927 were "Notes on lilies" (April), "The onion thrips" (April), "Some Bermuda aphids and their control" (May), "Aster yellows in Bermuda" (May), "Cultivation and care of grape vines" (June), "The diseases and pests of melons, etc." (July), "Plant quarantines and inspection of imported plants" (July), "Plant sanitation" (August), "Diseases and pests of sweet potatoes in Bermuda" (August), "The black tip disease of bananas" (September), "Regulations governing export of nursery stock, etc." (October), "Control of the sage bush in Hawaii" (November), and in 1928, "Plant pathological investigations and activities during 1926 and 1927" (January), and "Insect pests and diseases of corn in Bermuda" (February).

15. A description of diseases and pests of animals in Bermuda with suggestions for their control was prepared for the "Flower Garden Calendar," published by the Bermuda Garden Club and the Department of Agriculture.

16. A letter dealing with the "Occurrence of the Little Sulphur Butterfly" was contributed to the "Royal Gazette and Colonist Daily" for Monday, 24th October, 1927.

Matters dealt with in these publications will not be repeated in detail in the present report, which deals with diseases and pests mainly under the heading of their host plants.

DISEASES AND PESTS.

Antirrhinum. An outbreak of antirrhinum rust (**Puccinia antirrhini** Dietel and Holway) was observed in a small garden in January, 1928, the plants having become infected from others which had been left over the summer. To secure the elimination of the disease no plants should be allowed to grow through the summer.

Arrowroot. At the request of the Director of Agriculture an investigation was made of the starch of old Bermuda arrowroot in view of a suggestion that this differed in structure from St. Vincent arrowroot. Information received through the kindness of Dr. Chipp of Kew and Mr. E. Goulding of the Imperial Institute and the investigations of the writer seem to indicate that the arrowroot plant (**Maranta arundinacea**) formerly grown in Bermuda is not botanically distinct from that grown in St. Vincent but that the superiority of the Bermuda product was due rather to different climatic conditions and greater care in the extraction of the starch.

The caterpillar **Calpodes ethlius** Cram. (probably introduced in 1910) damaged very severely in March, 1928, the small plantings of arrowroot now confined to St. David's Island. Arsenical spraying was effective but was taken in hand too late. It is suggested that by cleansing up all the old arrowroot plants and those of the semi-wild cannas (**C. indica**), the insect could be eliminated from that island.

Aster yellows. Little has to be added to the reports (14 and 15) referred to above. Mr. F. M. Jones informs me that he collected **Cicadula sexnotata** Fall., the leaf-hopper responsible for the transfer of the disease, in 1909. The disease is common throughout the year, the leaf-hopper being extremely plentiful on plantings of Scots marigold (**Calendula officinalis**), lettuce and carrots, the last of which do not appear to be susceptible to the disease. The disease occasions considerable loss to growers of annuals for sale, and should be kept under control by intelligent planting and roguing out of infected plants. In several plots of lettuce over 20 per cent of the plants were found to be infected. The following additional host plants have been observed: **Senecio Jacobaea, Chrysanthemum maximum,** and the weeds **Parthenium Hysterophorus, Leptilon** spp. and **Helosciadium** (**Sison**) **Ammi.** The leaf-hopper has been found in isolated fields of lilies, but is apparently not associated with any of the virus diseases of these plants. In one case the disease appeared to be associated with the presence of the common leaf-hopper **Empoa fabae** Harr. but experiments to test its transmissability by this insect and by the aphids **Anuraphis tulipae** Boyer and **Macrosiphum gei** Koch were not successful.

Banana. The serious 'black tip' disease referred to in previous reports was found to be due to the fungus **Cercospora musarum** Ashby, which also brings about characteristic brown leaf spots with bright yellow margins. A full report of the writer's findings in connection with this disease will be found in the articles referred to above (12 and 14). In the writer's opinion attempts at the control of the disease should be aimed at the destruction of old and infected leaves and fruits, improvement of drainage and removal of excessive suckers.

A Phyllosticta probably identical with **P. musae-sapientii** Cif. & Frag. recorded from the Dominican Republic (Rev. Appl. Myc. VI, 10, p. 580) is very common on **Musa Cavendishii** in Bermuda, causing spotting and premature dying off of the older leaves.

A condition much resembling a mosaic disease on leaves of **Musa Cavendishii** was observed in Paget West in November, 1927. Linear streaks, usually about 1 mm. in breadth and 1 cm. in length, but frequently smaller, appear on the leaves. These streaks are often coalescent, are somewhat paler in colour than the normal leaf colour and on a background of pale yellowish green. The plants are slightly dwarfed. Attempts at transmission by transfer of juice and by rubbing normal with streaked leaves were not successful. The aphis **Pentalonia nigrinervosa** Coq. was present on the plants.

Fruit fly infestation (see under "Fruit Fly").

Beet. A few specimens of common scab on beets were found at the Station during December. It takes the form of raised crater-

like scabs with concentric rings some 5 mm. in diameter. The scabs are concentrated towards the top of the root.

Carrot. The leaf-spot fungus **Cercospora apii-carotae** Pass. was common in June.

Celery. The 1927 crop was again a record one, a gratifying result largely due to the improved strain secured from Messrs. Clause by the Director, and inspection of the seed, commenced in 1925, whereby practically complete control of celery late blight in the seed has been secured.

Five samples of French and three of American seed for the 1928 crop were examined. All these were satisfactorily free from blight pustules. The 1928 crop appears at the time of writing (March) to be entirely free from late blight.

Black heart was frequent on celery in shallow soils and on overripe plants in May. Further investigation of this condition bears out the conclusion already arrived at, that this is not a bacterial disease, but primarily due to unbalanced water relations.

A considerable amount of early blight (caused by **Cercospora apii** Fr.) was observed in June on celery plants left in the ground after the crop had been reaped.

Chinese cabbage. Severe injury to Chinese cabbage by springtails (**Sminthuridae**) was observed at the Agricultural Station in January, 1928, the symptoms being irregular abrasions which dried out to papery areas usually bordered by the leaf veins. At the same date similar injury was reported on garden stocks (**Matthiola incana**), the lower leaves especially being attacked. Good control was got by dusting with nicotine dust in the early morning.

Chrysanthemum. A severe outbreak of rust (**Puccinia chrysanthemi** Roze) on perennial chrysanthemums occurred in a garden in Paget in November. The plants were destroyed.

Citrus. A gratifying renewal of interest in citrus growing has taken place, large numbers of young budded trees having been imported. I should like to stress here the importance of early and continuous attention to the trees on the lines suggested in the article referred to above (13).

Damping off. Most, if not all, the damping off of seedlings in Bermuda is due to the fungus **Rhizoctonia solani** Kuhn. It is frequently found on flower seedlings in boxes, especially those which make a soft rapid growth. On cabbage and cauliflower seedlings it very commonly brings about the condition known as "wire stem." Rhizoctonias (probably strains of **R. solani**) have been observed to be associated here also with brown patches in turf, a rot of bamboo tips, damping off of anemone and ranunculus, a stem rot and wilt of carnations and brown stem lesions of lilies. The stem rot and tuber spot of potatoes caused by **R. solani** do not occur here. The use of the organic mercury disinfectant "Uspulun" (1 oz. to 3 gallons) has proved successful in the control of damping off of seedlings.

A failure of celery and other seedlings not to be ascribed to ordinary damping off was observed in December. The seedlings came above ground in a normal fashion, but made poor growth, remaining stunted and yellow in colour. This condition was in all probability due to the excessive lime content of the seed beds. Care should be taken in choosing ground for seed beds to avoid light sandy soil on which the vegetation, and especially beans, hibiscus hedges, or lilies, has a chlorotic (yellow) appearance.

Fruit fly. A further consignment of 1000 puparia of **Opius humilis** Silv., parasite of the Mediterranean fruit fly (**Ceratitis capitata** Wied.) was received from Hawaii through the kindness of Mr. H. F. Willard, Entomologist at Hawaii and Agent of the United States Department of Agriculture, Bureau of Entomology, Washington, and through the cooperation of the Federal Horticultural Board, to all of whom the Bermuda Department of Agriculture is very greatly indebted for their good offices in this respect. This consignment yielded 9 female and 100 male parasites, which yielded in Bermuda as a first generation 23 females and 85 males. A second consignment received on 5th July yielded 8 male parasites. The following liberations were made:

1927	Females	Males	
June	12	16	Paget East
July	1	10	Hinson's Island
	8	10	Paget East
	10	20	Smiths
	10	20	Warwick
September	4	2	Paget West
	8	2	Pembroke
October	11	16	Paget East
November	21	27	Paget East
Total (1927)	64	96	
January (1928)	14	6	

During September and December, 1927, and February, 1928, difficulties were encountered owing to scarcity of fruits. The methods employed in breeding the parasites are described in the article already mentioned (11).

Fruits of the Chinese banana (**Musa Cavendishii**) infested with the Mediterranean fruit fly were found in Pembroke Parish in the month of April, and a careful study of the matter was made, principally with a view to settling the question whether such infestations occur on uninjured fruits. Examination of green fruits on which punctures had occurred failed to reveal the presence of eggs in any case. In fruit turning yellow, however, both eggs and larvae were found in considerable numbers, the larvae being positively identified as **Ceratitis capitata.** It is considered that oviposition takes place when the fruit is partly ripe. In partly ripe fruit many of the larvae are killed by the tannins present in the skin.

A small planting of broad beans was found to be infested with the fruit fly on 28th May. The symptoms were similar to those observed in 1925 (see Ann. Rept. 1925, p. 42).

In a large planting of tomatoes next to infested peppers no fruit fly infestation was observed.

Hippeastrum (Amaryllis). A mosaic of hippeastrum has become increasingly prevalent in Bermuda in recent years. Formerly considerable numbers of bulbs were exported, but growers have found that plants now make very little growth, remaining stunted and seldom flowering. This condition is associated with mosaic-like streaking of the leaves similar to that recorded by L. O. Kunkel (Bul. Haw. Sugar Planters' Assn. Bot. Series, Vol. 3. Pt. 2. p. 108). No aphids are found on hippeastrum in Bermuda, but certain thrips and the mealybug **Pseudococcus citri** Risso are not uncommon. Control measures similar to those employed against the virus diseases of lilies should be attempted.

Hibiscus. Infestation by a small form of **Aphis gossypii** Glover caused severe leaf-fall of hibiscus hedges throughout the summer. This was checked by spraying with Black-Leaf-40, 1-800.

A species of **Myxosporium** brings about small purplish-brown spots on the twigs which coalesce and ultimately bring about girdling, leaf-fall and die-back. Control may be secured by judicious pruning.

Lettuce. Mr. E. L. Felix, of Cornell University, a specialist in lettuce diseases, who visited the islands in January, 1928, pointed out the presence of a severe mosaic disease of lettuce, which I had previously confused with aster yellows (q.v.). This disease brings about severe dwarfing, mottling, crinkling and failure to heart. It is transmitted through the seed, hence the planting of seed from reputable sources is highly recommended.

Mr. Felix corroborated my report of the presence here of a disease which brought about severe dwarfing and wilting, due to a root-infesting fungus (**Pythium** sp.).

Lilies. During the period under report complete proof was secured of the transmission of yellow flat by the commonest lily aphis. This aphis was at first considered by Mr. F. V. Theobald to be identical with **A. lilii** Takahashi, but further investigation proved it to be inseparable from **A. gossypii** Glover. The disease is fully reported on in paper 4 above.

The following aspects are of practical importance. Plants from affected bulbs do not show the symptoms till about four weeks after coming above ground. Most spread takes place in December and early January, hence it is of the highest importance to take up affected plants, bulbs and all, and destroy them as soon as they can be observed in the fields. Such plants should not be left at the edges of the fields. The fields should be inspected about once a week and any diseased plants rogued out. Fields should not be located near hibiscus hedges, a favourite host plant of the aphis. Spraying with a nicotine extract (such as Black-Leaf-40) or dusting with nicotine dust is recommended. Among weeds or in shady situations affected plants are not so markedly stunted, hence rogued out plants thrown down in such spots may appear to recover. No instance of recovery from the disease has been observed by the writer, and this would not be expected from the nature of the disease. Shells from affected

plants produce diseased "shell stock." Affected plants begin to die down around flowering time about two months before healthy plants. The bulbs from affected plants are flat, small and compact, and resemble bulbs of poor type 'longiflorums.' There is a marked tendency to splitting of the bulbs, so that in successive years smaller and smaller bulbs and plants are produced.

The mosaic disease has also been the subject of further investigation and will be reported on fully in paper (5). While many points are still obscure regarding this disease, there is abundant evidence that by systematic roguing and selection of clean plants for shelling down it can be eliminated from the fields. This disease is being made the subject of investigation by Mr. C. E. F. Guterman in cooperation with the writer in pursuit of a cooperative project by the Boyce Thompson Institute, Horticultural Society of New York, Cornell University, New York Botanical Garden and this Department. Mr. Guterman visited Bermuda for ten days in February, 1928, at the expense of the Colony, and bulbs for experimental purposes are being supplied from Bermuda.

Studies were made on the Botrytis disease of lilies to determine whether it was connected with the Botrytis leaf-spot of geraniums and Botrytis disease of roses found in Bermuda. Only one case of Botrytis blight was observed early in the season in 1927, on St. David's Island, among plants which had been grown from bulbs on which blight was present the previous season. The plants had not been dug. The increased care in cultivation, spraying and disposal of refuse now makes an early outbreak of Botrytis blight a rare occurrence.

Further investigations were also made on the Phytophthora disease of lilies. Severe outbreaks of this disease took place in the spring of 1928 where lilies had been planted in ground on which it was common during the previous season. In some cases the young shoots were attacked before they came above ground. Bordeaux mixture was found to be effective in controlling the disease on plants above ground. The disease was common on buds and flowerstalks in certain fields during March, 1928.

Two Aspergilli isolated from lily bulbs have been identified by Dr. Charles Thom as near **A. melleus** Lukawa and near **A. luteoniger** (Lutz) T. & C. These fungi are found only on bulbs in poor condition through being unsuitably stored and could not be got to infect healthy scales. Work on the spotting of the bulbs common in certain soils ('black scale') again showed that this condition is a physiological one due to small points of asphyxiation taking place in heavy or water-logged soils, and cannot be classed as a disease. Such bulbs produce healthy plants. The Volutella sometimes found on the spots is purely secondary. It is very fortunate that Bermuda is entirely free from any organisms causing rot of the bulbs. With a view to preventing the introduction of such diseases, common in Japanese bulbs, an embargo has been placed on all bulbs of the genus Lilium (see below).

Chlorosis was found in many fields subsequent to the heavy rains in the early part of the 1927-28 season. This condition is due to certain soil reactions not properly understood. The advice of the Rothamsted Experiment Station has been sought on the question.

If the chlorosis is not marked the plants usually show a greening up about the end of February. In severe cases dying off of the tips takes place. No remedy has been found.

Three aphids are found in lilies in Bermuda, **Aphis gossypii** Glover, (responsible for the transference of yellow flat); **A. sinensis** del Guercio (?), a brown species almost as common as the first; and **Neotoxoptera violae** Perg, rarely present. All these are easily controlled by dusting with nicotine dust or spraying with Black-Leaf-40 (1-800). The flower thrips **Frankliniella insularis** (Frankl.) is a very common pest of the blooms.

Five sets of specimens of Lilium Harrisii from greenhouses in the United States of America were forwarded to the writer for report. In three cases the bulbs had failed to sprout entirely or had made very poor growth. This condition was ascribed to excessive storage at low temperatures, to which the Bermuda lily is very sensitive. In one case the flowers were badly split, a condition probably due to too rapid forcing or sudden change of temperature. In the remaining case the plants were affected with yellow flat and spread of this disease had apparently taken place in the greenhouse.

Official inspection of lily fields in the year 1927 was begun on 8th March. The total number of fields inspected amounted to 195, belonging to 114 growers. The total area of saleable Harrisii bulbs amounted to a little over 40 acres. The quality of the fields was exceptionally good, only 12 fields being condemned. Certificates of inspection were issued on 16th May. The quality of the bulbs brought to the packing sheds was excellent, the percentages of basal rot and longiflorums being negligible.

Official inspection in 1928 had not been completed up to the time of the compilation of this report. It may be said however that the quality of the fields was as a whole superior to that of 1927, although carelessness on the part of several small growers necessitated a number of reinspections. The standards of inspection were as follows: Yellow flat, 0; longiflorums, 0; basal rot, 0; severe mosaic, 5. Mr. E. L. Adams did very satisfactory work as my assistant.

In 1927 types of L. longiflorum from bulbs kindly supplied by Messrs. Henry and Lee were grown at the Station and in 1928 some two dozen calcophilous species were tried. In both seasons **L. regale** was found to be a failure. It has been tried by at least three different growers in Bermuda without succsss. **L. Davuricum** flowered at the Station in February, 1928, but made very poor growth.

Oleander scale. A slight recurrence of the oleander scale (**Diaspis pentagona** (Targ.)) took place in some localities in consequence of the exceptionally warm summer in 1927, but it is now satisfactorily under control by the introduced parasite (**Aphelinus diaspidis** Howard).

Onion. During a period of continuous wet weather in March, 1928, observations were made on the so-called "blight" prevalent in the fields. It was found to be distinct from true blight caused by **Peronospora Schliedeni** Ung. not now present in Bermuda, and from injury by the "pink root" fungus and thrips. The

first symptoms are minute water-soaked areas on the leaves, especially on the older leaves. Under the very moist conditions prevalent in Bermuda at that season these enlarge rapidly and soon involve most of the area of the lower leaves which become soft and rotten and give off an offensive odour. If dry weather supervenes the water-soaked areas dry up and become white in colour and little further damage is done beyond a check to the growth of the bulb. In low lying situations, however, or during times of excessive rain the soft rot progresses down the leaves to the bulbs which quickly disintegrate, along with the tender heart leaves. The disease is associated with bacteria, probably **Bacillus carotovorus** Jones, a strain of which is responsible for soft rot of turnips in Bermuda. The bacteria apparently cannot penetrate the leaf except through an injury such as a break where the leaf has bent over, a dying off of the tip due to pink root, small abrasions due to thrips, or larger injuries due to snails (**Polygyra appressa** Sag.) or wood lice (**Armadillium vulgare** Latz). The disease is, therefore, a complex one, chiefly dependent on excessive humidity. The only control measure at all feasible would be to spray the plants with Bordeaux mixture (with the addition of 5 lbs. of soap per 100 gallons as a sticker), the spray being directed at the bases of the plants. It is questionable, however, whether this would pay when the prevailing prices for onions are considered.

Palmetto scale. (**Comstockiella sabalis** (Comst.)). In consequence of the warm summer of 1927 this scale became troublesome on St. David's Island. Several trees are badly infested. This outbreak will have to be carefully watched, since biological control in this case may not be satisfactory.

Papaw. The **Gloeosporium** and other fruit spots of papaw have been under investigation. It was found that the former (probably **G. piperatum** E. & E.) occurs also on decaying petioles, hence clean culture is recommended as one of the most likely means of control.

Peach. The bacterial disease of peaches (**Bacterium pruni** E.F.S.) causing brown spots and shot-holes on the leaves was found to be common, while in one planting the black peach aphis (**Anuraphis persicae-niger** (Smith)) brought about distortion of the shoots.

Pomegranate. The fungus responsible for the failure of these fruits in Bermuda in recent years was found to be **Cercospora lythracearum** H.2 W. (see F. A. Wolf, "Pomegranate Blotch," J. Agr. Res., Sept., 1927). This could no doubt be kept down by the use of copper fungicides.

Potato. Late blight of potatoes was first observed on 27th February in the season 1926-27 and during the second week in March in the season 1927-28. The majority of the growers are now well aware of the value of fungicidal applications as a preventative measure for this disease and due precautions are taken. The small grower is, however, extremely slow to learn. Good work was done by the Station power sprayers in both seasons and growers agree that this method is cheap, rapid and effective. The dusting method has been followed by the small grower who does not wish to have the trouble of making up spray solutions. It is essential that one or the other form of fungicide be applied to the Garnet crop.

In the case of the autumn crop of Bliss Triumphs there is a heavy infestation of the leaf-hopper **Empoa fabae** Harr. which brings about every year severe hopper-burn, which is confused by the growers with other forms of injury. Although late blight is usually absent from this crop, it is highly advisable to spray it with Bordeaux mixture, which has been found to be the most satisfactory repellent for this insect.

The fungus **Sclerotium rolfsii** Sacc. was found at the bases of stalks of ripening potatoes on St. David's Island. It had previously been found causing rotting of potatoes in storage. Loss may be avoided by picking out affected tubers and by soaking in formalin solution. The fungus was probably introduced on arrowroot tubers from St. Vincent (see below). In July the same fungus caused wilting of violet plants in Devonshire parish.

A case of severe injury by the "seed corn maggot" (**Phorbia fusciceps,** Zett.) was observed in November (see also 1926 report, p. 41). The formation of galleries in the bases of the potato stems gave rise to the production of small aerial tubers above the point of injury and subsequently to sudden wilting. Probably the seed corn maggot is responsible for a good deal of the injury ascribed by growers to cutworms. Manure should be applied well ahead of planting time, since rotting manure or pomace attracts the flies.

Sweet potato. The tuber spot **Sphaeronema fimbriatum** (E. & H.) Sacc. has to be recorded from this crop in Bermuda from one planting.

Miscellaneous diseases. The following additional and apparently not previously recorded fungi of practical interest were observed in Bermuda in the period under report:

Nigrospora oryzae (B. & Br.) Petch. on banana leaves (not pathogenic).

Peronospora sp. (? **P. manshurica** (Naoum) Syd.) on soy bean (leaf-spot).

Phyllosticta spp. on crotons (leaf-spot and die-back) and poinsettia (leaf-spot).

? **Colletotrichum hibisci** Pollaci (die-back of hisbiscus).

Gloeosporium sp. on Vinca rosea (die-back).

Pestallozia sp. on loquat (leaf-spot).

Empusa sp. on the cutworm **Feltia subterranea.**

Cercospora violae Sacc. on Viola ordorata (leaf-spot).

Ascochyta pisi Lib. on garden peas (leaf-spot).

Macrophomina phaseoli (Maubl.) Ashby on lima beans and lily roots.

The following new and additional insects of practical interest were observed:

Aphidae. **Aphis maidis** Fitch on corn.
Aphis tavaresi del Guerc. on Bidens pilosa.
Sipha flava (Forbes) on sugar cane and grasses.
Brevicoryne brassicae L. on kale.
Macrosiphoniella sanborni Gill. on chrysanthemums.

Coccidae. **Phenacoccus** sp. A troublesome mealybug on sage-bush and various garden plants.

Thripidae. **Heliothrips femoralis** Reut. and **Echinothrips americanus** Morgan on greenhouse plants.

Coleoptera. **Leptostylus praemorsus** F. Boring in Poinciana trees.
Bruchus quadrimaculatus F. on bird-eye peas in storage.

Lepidoptera. **Terastia meticulosalis** Guen. Shoot borer of Erythrina.

Quarantine regulations. During the year an embargo was placed on all bulbs of the genus **Lilium** (to prevent the introduction of soft-rot and other fungi) and **Narcissus** (to prevent the introduction of the bulb flies (**Merodon equestris** and **Eumerus strigatus**) and on sorghums and sugar cane in the raw state (to prevent the possible introduction of the European corn borer **Pyrausta nubilalis**).

Interceptions. The following are the most important pests and diseases intercepted during the period under report: Soft rot (associated with **Rhizopus** and **Penicillium** spp.) on lily bulbs from Japan and Europe (twice); the rust **Phragmidium disciflorum** James on roses from England (twice); **Sclerotium rolfsii** Sacc. on arrowroot tubers from St. Vincent; the coconut whitefly (**Aleurodicus cocois** (Curtis)) on palms from Trindad; ants (unidentified) on plants from the Azores; and termites (unidentified) on caladiums from Trinidad. In addition to several of the above the following, imported contrary to regulations, were destroyed: two consignments of carrots and two parcels of potato tubers from England. Two consignments of lily bulbs were returned to the United States of America. Six fumigations were carried out.

Fungicides and insecticides. Calcium cyanide was used with satisfactory results against land crabs. Paradichlorbenzene has been found of much value against mealybugs infesting roots of plants, white grubs (**Ligyrus** spp.), etc. Uspulun has been used with success in cases of damping off.

MISCELLANEOUS.

Visitors. Laboratory accommodation was afforded to Mr. H. K. Lewcock, Mycologist to the Prickly Pear Board of Australia, who visited Bermuda from 18th November, 1926, till 18th January, 1927, and to Messrs C. E. F. Guterman and E. L. Felix, of Cornell University, from 3rd February to 14th February, 1928.

Absence of Director. During the absence of the Director from 28th May to 13th June I acted as Officer-in-Charge of the Department.

Exhibits. At Annual Agricultural Exhibition (27th, 28th and 29th April) and Somerset Flower Show (12th May).

Addresses to clubs, etc. Pembroke Garden Club (5th February, 1927)—"Aster yellows;" Warwick Academy (4th March)—"Natural history."

Inspection services. During 1927 a total of 357 parcels containing plants were examined by me at the Post Office, 29 consignments of plants at the docks and 10 shipments of bananas. During the first three months of 1928 the following were examined: 61 parcels at the Post Office and 15 consignments of plants at the docks.

Visits. A total of 413 visits to farms and gardens was paid in 1927 and 139 during the first three months of 1928.

At the conclusion of this my final report may I express my sincere regret at severing my connection with the Department and my sincere appreciation of the many personal kindnesses which I have received. I trust that the work accomplished will prove of lasting value.

Respectfully submitted,

LAWRENCE OGILVIE,

5th April, 1928. Plant Pathologist.

Report of First Agricultural Assistant

Director of Agriculture,

BERMUDA'S PARTICIPATION IN THE WORLD'S POULTRY CONGRESS.

I beg to submit my report relative to my attendance at the World's Poultry Congress, held at Ottawa, Canada, from 27th July to 4th August and on other items of agricultural interest gathered while attending the Congress and on my subsequent tour across Canada as a guest of the Canadian Government.

I left Bermuda with the exhibits on 12th July; I arrived in New York on 14th and left for Ottawa at 10 p.m. on the same day. The material for the exhibit, which included six pairs of live poultry, had been cleared from Customs previous to my leaving New York, and were forwarded to Ottawa in bond. I arrived at Ottawa at mid-day of 15th, but the exhibits did not arrive until noon of 17th. I commenced to assemble the exhibits on 19th, and by the opening day everything was in order.

Opening of Congress. The formal opening of the Congress took place in the Auditorium building at 10 a.m. on 27th July, when over 5,000 official delegates representing forty-five countries participated. The Congress was officially opened by Viscount Willington, Governor-General of Canada. After extending a very cordial welcome to the visiting delegates, he expressed the hope that the deliberations of the Congress would promote international friendship, as well as the advancement of poultry culture.

Viscount Willington was supported by Mr. Mackenzie King, Prime Minister of Canada, Mr. W. R. Motherwell, Minister of Agriculture of Canada, and Mr. Balharrie, Mayor of Ottawa, who conferred upon Mr. Edward Brown, Congress President, the freedom of the city of Ottawa. Mr. Brown, Hon. Wm. Phillips, United States Ambassador, Mr. W. B. Wilton of Holland and Don Salvador Castello of Spain appropriately replied on behalf of the delegates.

Scientific Meetings. The mornings of Congress week were devoted to the discussion of scientific papers, which will be available in a bound volume in due course.

Congress Exhibition. Live poultry and educational and commercial exhibits were staged at Landsdowne Park. Separate buildings were provided for international exhibits, Canadian Government exhibits and commercial exhibits. Our exhibit was located in the International building together with exhibits from Egypt, Germany, Great Britain, Holland, India, Italy and Spain. Exclusive of H.M. the King's exhibit of pigeons and the poultry exhibited by H.R.H. The Prince of Wales in Great Britain's booth, Bermuda and India were the only other exhibitors to show live birds in this building. Our booth was well patronised throughout the Congress week, and we received many congratulations for our good display. The quality of the birds which we exhibited was very favourably

commented on, for they were in better feather than the majority of the birds on exhibition, and as combinations of production and exhibition qualities they stood very high.

To what extent the Congress will help Bermuda will depend entirely on the poultry breeders themselves. There is plenty of room for development, and this can be chiefly achieved by cooperative methods.

Trans-Canada Tour. As a guest of the Canadian Government, together with 121 other delegates representing seventeen other countries, I toured Canada from the Atlantic to the Pacific. Accompanied by the Hon. W. R. Motherwell, Federal Minister of Agriculture, we left Ottawa for the Maritime Provinces in a special train of the Canadian National Railway on 5th August. Leaving the Maritimes by the way of Quebec and Ontario, on the southern route, we travelled to Victoria, B.C. We returned by the Canadian Pacific Railway over the Northern route to Toronto, and from Toronto to Niagara Falls and back to Toronto over the Canadian National Railway; here the tour was concluded on 31st August. We visited every Province in the Dominion, and in every Province we were accorded an official welcome by the Provincial Government.

Poultry Farms Visited. The tour across Canada afforded an unique opportunity to see the poultry plants of the country. I was disappointed with the flocks of poultry on the general farms, but the specialised poultry plants were of very high order. Of all the Canadian Provinces, British Columbia is the most important poultry centre. In fact, poultry keeping is fast replacing dairy farming in this Province. Poultry keeping in conjunction with fruit growing is very popular in many sections of Ontario as well as British Columbia. I regret I did not have sufficient time to look more fully into the details of poultry keeping in these Provinces as they struck me as being very suitable for Bermuda. The Experiment Stations in Canada are doing very valuable poultry work, and much of the success of the poultry industry of Canada is due to their efforts. The Canadian Government has instituted a system of inspection of egg-laying records on private plants, and in conjunction with the official egg-laying contests, it has instituted a system of registration which has been of inestimable value to the poultry men of the Dominion.

Sale of Lily Bulbs in Canada. I made enquiries along this line as fully as the time at my disposal permitted. I interviewed two nurserymen in Ottawa who had at one time grown our bulbs, but had discontinued in preference to lower-priced Japanese bulbs. They admitted the superiority of the Harrisii to the Japanese bulbs, but stated that the difference in the price was too much to warrant their use. British Columbia impressed me as being a potential market for our bulbs. British Columbia uses flowers for decorative purposes to a larger extent than anywhere else I have visited. The city of Victoria is spending huge sums of money in beautifying its parks and other public places, and its citizens are following this example by beautifying their city lots. They told me that they found it a very profitable investment, as it brings them a large number of tourists of the better class. The same thing applies to the whole of Western Canada, where to a lesser extent the flower is found a valuable advertising agent. I think we would profit by taking a lesson from our Canadian cousins. I do not think there will be a very large market

for our bulbs in Canada in the immediate future, but the population is growing rapidly, and it would be well for us to obtain an early foothold. If we are to increase the market for our bulbs, it is obvious that we will have to reduce our marketing costs in order to compete with bulbs from other sources.

Potatoes in Prince Edward Island. Mr. Peppin, the Inspector, has been experimenting for a few years with both Garnets and Triumphs. While he has been able to reduce the percentage of leaf-roll and mosaic, their general conduct is not yet satisfactory. He has been handicapped in his experiment on account of not having been able to procure disease-free tubers to start with. I suggest that we supply Mr. Peppin with a small sample of each variety from a reliable source.

New York Market Conditions. I gathered that Cuba is increasing her acreage of potatoes and she is doing everything possible to improve the conditions under which her potatoes are marketed in New York. Likewise the Southern States are planning to grow more vegetables. With these facts facing us we cannot afford to stand still. We must do everything possible to reduce the cost of production, and above all we must improve our grading methods to meet our competitors.

Advertising Bermuda. The World's Poultry Congress and the subsequent tour across Canada was undoubtedly one of the best practical means of advertising Bermuda that has yet been attempted. The publicity given Bermuda in the Canadian Press during the Congress and on the subsequent tour across Canada, and the attendance of 160,000 people at the exhibition, a large percentage of whom were Americans, must have been of very great advertising value. A large quantity of advertising material was distributed at the booth during the Congress and on the subsequent tour across Canada from coast to coast.

Bermuda Delegates. Associated with me were our other official delegates in the persons of Mr. A. F. Christensen, Mr. James Christensen, Mr. Roderick Christensen and Mr. C. W. Hollis. Other Bermudians who were associate members of the Congress included Mrs. A. F. Christensen, Mrs. Harry Dunkley, Miss Mabel Dunkley, Miss Marjorie Hallett and Mr. and Mrs. Harry Outerbridge. I received a great deal of assistance from them all, and each one did his or her part to advertise Bermuda.

Other Matters. Other matters enquired into, and already reported on, are not here included.

Appreciation. I desire to express my appreciation to the many people who contributed towards the success of our exhibit. It would take too much space to mention them all, but I would like to specially mention my co-delegates who helped me so much at Ottawa, Mr. and Mrs. L. W. Howarth for their generous contribution, and Mr. F. C. Elford, Congress Director, and Mr. Ernest Rhoades, Congress Secretary, for their kindness to me and the other delegates, and the Furness Bermuda Line for their generosity in transporting the exhibits free of charge.

EGG LAYING CONTEST, 1927-1928.

Conducted at Haulbowline Farm, Smiths Parish, L. W. Howarth, Esq., Proprietor, under the supervision of the Department of Agriculture.

After a lapse of a year the third Egg Laying Contest was started on 1st November, 1927.

The contest was made possible through the generosity of Mr. L. W. Howarth, who undertook to erect the contest plant and to operate the contest at his own expense. The plant, which is located on and operated as an unit of Mr. Howarth's well laid out poultry farm in Smiths Parish, is situated in a most favourable location from a poultry keeper's point of view and is one of the best equipped of its kind to be found anywhere. Ninety birds make up thecontest and consist of fifteen pens of six birds each, and each pen has one reserve bird.

Five varieties are represented, made up of seven pens of White Leghorns, three pens of Barred Rock, three pens of Rhode Island Reds, one pen of Buff Rock and one pen of Anconas. Five of the pens come from Pembroke, three from Warwick, two from Southampton, one each from Devonshire, Paget, and one each from Canada and the United States of America.

The contest, which will be conducted over a period of twelve lunar months, will be decided by the highest number of points secured, computed in accordance with the scale published in the rules of the contest, namely, special grade eggs, 1¼ points; first grade eggs, 1 point; second grade eggs, ¾ point. Qualifying weight of eggs: during first period of four weeks—special grade, not less than 2-2/16 ozs; first grade, not less than 1-14/16 ozs; second grade, not less than 1-10/16 ozs; during the second period of four weeks—each grade to be 1/16 ozs heavier than the corresponding grade for the first period; for the remainder of the contest each grade to be 1/16 oz heavier than the corresponding grade for the second period. Eggs below second grade are not to be counted in the records.

The management of the contest is vested in the Manager of Haulbowline Farm, and a representative of the Department of Agriculture acts as a general supervisor.

The average production for the first two lunar months was 182.06 eggs. The first two positions were held by Rhode Island Reds and White Leghorns with scores of 172¼ and 151 respectively. The two leading individuals were Rhode Island Reds with scores of 45¾ and 40¾ points respectively.

The results so far attained justify the prediction that the contest will prove a success.

The thanks of the community are due to Mr. Howarth for his public spiritedness in financing the contest which should do much to create more interest in and add to the knowledge of local poultry culture. Mr. Howarth has been ably assisted by his two assistants Mr. J. Heenan and Mr. R. Landman, who have worked hard to make everything in connection with the contest a success.

Respectfully submitted,

W. R. EVANS,

21st January, 1928. First Agricultural Assistant.

Report of the Inspector of Produce for the Season 1926-1927

The Director of Agriculture,

I have the honour, under the provisions of The Agricultural Inspection Act, 1921, to forward my report on the inspection of produce and lily bulbs shipped from the Colony during the season 1926-1927, and seed potatoes imported.

INSPECTION OF SEED POTATOES.

Garnets. There were imported from Nova Scotia 9,554 barrels, and from Prince Edward Island 154 barrels.

Triumphs. For March planting, to provide seed for early Fall planting, there were imported the following quantities:

Nebraska	400 barrels
Wisconsin	176 "
New Brunswick	200 "

From Long Island, for the main Fall planting, there were imported 3,512 barrels.

Irish Cobblers and Green Mountains. Five hundred and seventy barrels of Irish Cobblers and 20 barrels Green Mountains were imported from Nova Scotia. This seed was imported for planting for home consumption, but owing to the small crop and rise in price in the New York market quite a lot of these were exported.

Quality of Seed. The above potatoes were on the whole of good quality and sound condition, the grade was much above the average of previous years. Triumphs from Nebraska gave quite a good yield, while those from Wisconsin did not do so well. The acreage under potatoes was about the same as last year. Triumphs yielded a crop very much below the average, due to the hurricane on 22nd October, which occurred at the time when the plants were in a most vigorous growth, free from leaf-roll and mosaic. The imported seed suffered somewhat, but recovered a little later owing to second cultivation, but the yield throughout was small. Cobblers made quite a good start, but owing to dry weather, the early plantings especially yielded small returns.

INSPECTION OF PRODUCE.

Green Vegetables. On 5th December, 1926, the green vegetable season opened with a shipment of 19 crates. The same ship took 549 barrels potatoes. Four hundred and eighty three had been shipped to 30th November.

Throughout the season green vegetables may be described as fairly good.

Celery. This crop was the largest crop ever reaped, and almost entirely free from blight. The percentage of black heart was very low, also, in comparison with former years. Owing to lack of chillroom accommodation towards the end of the season, some celery had to remain unreaped when already sufficiently ripe to be exported, and naturally black heart set in, and fireworms barked the stalks as well.

Beets. This crop was not up to the standard of previous years, and unfavourable weather was probably the cause.

Carrots. Carrots were good and did not show quite as much top as last season, but there is still room for improvement regarding excessive tops which should be taken off. This applies to beets also.

Kale. This crop was on the whole good. It did not show as many yellow leaves as in former seasons. The acreage was smaller.

Lettuce. Lettuce seems to be a crop of the past.

Parsley. Parsley was very good throughout the season.

Tomatoes. The crop of tomatoes was far above that of last year both in respect to quantity and quality. The grading was much improved, also wrappers and containers.

Onions. The quality was very good, but the quantity extremely small.

PRODUCE REJECTED ON FIRST INSPECTION.

The percentages rejected on first inspection were as follows:

Celery	3.3 per cent
Onions	.5 " "
Kale	.8 " "
Potatoes	1.3 " "
Tomatoes	.4 " "
Other vegetables	2.3 " "

Most of the above passed on second inspection after adjustments with respect to defects found therein (under size, slackness, improperly coopered or nailed, poor crates and badly made). With regard to carrots, some were very small in size, or of poor shape, or very green.

APPEALS.

Two: (1) with respect to a lot of celery, the decision in favour of the Inspector, (2) with respect to celery, the decision against the Inspector. (This same shipment of celery went forward to New York and was reported by the Assistant Inspector on his return to Bermuda as arriving in almost unsaleable condition).

PROSECUTIONS.

One.

QUANTITIES SHIPPED.

The following quantities of produce were shipped:

	Canada	West Indies	United States	Totals	
Beets	—	—	11,366	11,366	bushels
Carrots	—	—	44,833	44,833	"
Celery	—	—	109,302	109,302	"
Kale	—	—	23,319	23,319	"
Lettuce	—	—	1,168	1,168	"
Onions	8,042	1,042	10,486	19,930	"
Parsley	—	—	55,619	55,619	"
Potatoes	28	1,374	34,670	36,072	barrels
Tomatoes	16,056	132	—	16,188	crates
Turnips	—	—	760	760	bushels
Miscellaneous	1,522	309		1,831	"
Lily bulbs	22	—	5,814	*5,943	cases

Total number of green vegetables shipped, 255,765 bushels; in 1926, 284,135 bushels.

*Including 107 cases to Great Britain.

SUPERVISION OF CHILLROOM.

This duty was carried out by the Inspector and Sub-Inspectors. The conditions were found to be satisfactory with regard to storing, etc.

FARMERS' MARKET.

This market, which has been open for several years for two days per week, continues along at the same standard, being practically furnished with produce from two farms only. A larger number of farmers should interest themselves in this market, for it would probably improve with increase of produce. The quality of the produce was good, and always sold well.

INSPECTION OF NURSERY STOCK.

Bulbs and nursery stock imported were inspected at the dock, and when found infected or not satisfactory were reported to the Plant Pathologist.

As far as practicable, all passengers to the United States wishing to carry in cuttings, bulbs, plants, etc., were advised to refrain because of the Regulations of the Federal Horticultural Board.

LILY INSPECTION IN PACKING SHEDS.

Inspection was begun on 14th July and was carried on daily until 13th August, after which date there were occasional inspections made of small lots. The condition of the bulbs was on the whole very good. I am of opinion that the existing Regulations are inadequate to properly safeguard this industry, and strongly recommend their amendment.

SUMMER DUTIES.

Monthly reports of other summer duties were presented.

REMARKS AND RECOMMENDATIONS.

Potatoes. The Triumph crop of potatoes this season graded much smaller than usual. The early Garnet crop was little better in this respect, but improved towards the end of the season. I strongly recommend that grade No. 3 of potatoes be abolished.

The greatest care should be taken both by farmers and Inspectors with regard to soil on potatoes when barrelling.

Number of Bunched Vegetables. Great care should be taken in bunching vegetables in order to meet the demands of the trade. Vegetables coming from other localities to the New York market are often superior to ours in quality.

ASSISTANT INSPECTOR IN NEW YORK.

The duties in New York were carried out by Assistant Inspector Hollis during the season, Mr. Winter accompanying him for a short time. His duties, in my opinion, were capably carried out, and he appears to have gained the esteem of the receivers.

In his report, dated 6th July, Mr. Hollis made the following remarks and recommendations:

Beets. A medium-sized beet with small top is the best seller. Excessive tops should be trimmed.

Carrots. There is no demand for small carrots, either bunched or loose. Long tops on carrots should be trimmed, for the buyers do not want tops. Crates for loose carrots should be made up with 1½ inch (or 1¾ inch) nails, six nails to each slat.

Celery. On the whole this season's celery crop was of excellent quality.

Kale. Kale crates should be made of sufficiently heavy material.

Onions. Greater care should be taken in properly facing onions.

Potatoes. Both Triumph and Garnet potatoes were rather small in size, and I think this affected the price. Triumphs stored at length lost colour. Distinctive marks should be made on the two varieties when shipped together. The shipment of Irish Cobblers or other white-skinned varieties is not recommended. Greater care should be exercised in marking potatoes, for too many No. 2's are marked No. 1. As little soil as practicable should go into the barrels. On 8th February I advised that Triumphs should be moved more freely at $14.50.

It is recommended that trial shipments should be made of Triumphs packed in bushel crates.

Grading and Packing. Too much care cannot be taken in the preparation of produce for the New York market, for our competitors, as a rule, give greater attention to grading and packing.

ACKNOWLEDGEMENT.

I desire to acknowledge the courtesy extended to me by Captain N. E. Holmes, Wharfinger, for setting aside a space for repacking vegetables, also Chief Engineer Cairns of the "Fort Victoria" with respect to vegetables arriving in New York in such excellent condition, due largely to satisfactory chillroom conditions.

Respectfully submitted,

E. L. ADAMS,

Inspector of Produce.

Devonshire,
31st December, 1927.

Report of the Government Veterinary Officer for the Year 1927

The Director of Agriculture,

I have the honour to present my report for the year 1927, and I desire to say, in the first place, that the conditions existing among domestic live stock is for the most part highly satisfactory. Probably more improvement in breeding was brought about during the year under report than in any other year during which I have held office. Especially with respect to dairy cattle has improvement in quality taken place.

Horses. Several cases of influenza occurred, but nothing of an alarming nature.

Dairy Cattle. Three animals were slaughtered because of tuberculosis. In my opinion few cases of this disease now exist. The animals in all the larger dairies were tested, and no re-action is to be reported among them.

Pigs. Cases of sickness among pigs in Paget West and Warwick East were examined and found to be not serious.

Dogs. A few cases of distemper are to be reported.

Poultry. It is unnecessary, perhaps, for me to comment on the improvement in poultry, for the birds exhibited at the two poultry shows of the year spoke for themselves. The members of the Poultry Association are to be congratulated, particularly in the untiring efforts of Mr. W. R. Evans of the Department.

Cases of Cruelty to Animals. In all 32 cases were examined.

General Board of Health. For the General Board of Health 946 examinations were made.

Respectfully submitted,

R. L. TUCKER,

Government Veterinary Officer.

Brightside, Flatts,
26th March, 1928.

Appendix A

Expenditure (Exclusive of Salaries) for the Year ended 31st December, 1927.

1. FEES TO MEMBERS OF BOARD.

Appropriated by Act No. 46, 1926		£ 70 0 0
Paid to members for attendance	£ 50 16 0	
Unexpended balance	19 4 0	
	£ 70 0 0	£ 70 0 0

2. GENERAL GRANT.

Appropriated by Act No. 46, 1926		£2200 0 0
Labour on experimental plots, lawns, flower beds, glasshouses and drives, and care of live stock	£1461 10 7	
Remuneration to Agricultural Students	40 10 0	
Carting and plowing	103 19 0	
Manure and fertilizers	21 0 9	
Seed potatoes, seeds, bulbs and plants	78 17 11	
Live stock—feed, bedding and incidentals	191 2 2	
Repairs and renewals of tools, implements, buildings, etc.	182 17 11	
Cleaning offices	13 6 0	
Stationery and printing, local	63 4 9	
Stationery and printing, foreign	31 9 5	
Agricultural Clubs, prizes to	4 11 0	
Foreign postage	4 10 0	
Sundry	2 5 8	
Unexpended balance	14 10	
	£2200 0 0	£2200 0 0

3. INSPECTION SERVICES, MARKET INVESTIGATION AND CONTINGENCIES.

Appropriated by Act No. 46, 1926		£1250 0 0
Inspection at dock	£ 516 16 0	
Inspection of seed potatoes in the United States	12 16 1	
Investigations made by Director with reference to proposed increase of duty on Bermuda celery	71 4 10	
Representative in New York, Mr. G. E. Winter	52 9 4	
Representative in New York, Mr. T. Arthur Hollis	272 9 4	
Advertising lily bulbs in England, etc.	80 9 0	
Cables	53 1 6	
Printed tape for advertising green vegetables	40 15 2	
Expenses in making representation with respect to adjustment of freight rates	24 4 5	
Maintenance allowance of First Assistant in Canada	16 13 4	
Supplies and contingencies	83 10 4	
Unexpended balance	25 10 8	
	£1250 0 0	£1250 0 0

4. ERADICATION OF ANIMAL DISEASES.

Appropriated by Act No. 46, 1926		£ 100 0 0
Compensation to owners of condemned stock	£21 0 0	
Supplies and contingencies	51 2 2	
Unexpended balance	27 17 10	
	£ 100 0 0	£100 0 0

5. PURPOSES OF PLANT AND BULB DISEASES AND PESTS ACT.

Appropriated by Act No. 46, 1926		£ 200 0 0
Labour	£ 7 10 0	
Expenses of Plant Pathologist in connection with inspection of lilies in greenhouses in the United States	3 7 11	
Equipment and contingencies	159 8 10	
Unexpended balance	29 13 3	
	£ 200 0 0	£ 200 0 0

6. IMPROVEMENT OF LIVE STOCK.

Appropriated by Act No. 46, 1926		£ 75 0 0
Purchase of breeding stock	£ 23 10 1	
Supplies and contingencies	51 5 3	
Unexpended balance	4 8	
	£ 75 0 0	£ 75 0 0

7. ANNUAL EXHIBITION.

Appropriated by Act No. 46, 1926		£ 300 0 0
Appropriated by Resolve No. 15, 1927		140 0 0
Labour, material and contingencies	£ 440 0 0	
	£ 440 0 0	£ 440 0 0

8. PURCHASE OF BOOKS AND SCIENTIFIC APPARATUS.

Appropriated by Act No. 46, 1926		£ 25 0 0
Apparatus, books and contingencies	£ 24 18 6	
Unexpended balance	1 6	
	£ 25 0 0	£ 25 0 0

9. DEPARTMENTAL CONTINGENCIES, TRAVELLING EXPENSES OF OFFICERS OF DEPARTMENT, TELEPHONES, LIGHTING, ETC.

Appropriated by Act No. 46, 1926		£ 120 0 0
Carriage hire	£ 30 13 0	
Telephones	12 10 0	
Electric light and power	10 4 7	
Printing, local	41 16 4	
Foreign postage	10 10 0	
Supplies and contingencies	13 8 3	
Unexpended balance	17 10	
	£ 120 0 0	£ 120 0 0

10. REPRESENTATION AT WORLD'S POULTRY CONGRESS.

Appropriated by Act No. 46, 1926		£ 85 0 0
Expended	£ 85 0 0	
	£ 85 0 0	£ 85 0 0

11. RENT ALLOWANCE TO PLANT PATHOLOGIST.

Appropriated by Act No. 46, 1926		£ 100 0 0
Expended	£ 100 0 0	
	£ 100 0 0	£ 100 0 0

12. LILY BULB ADVERTISING.

Appropriated by Act No. 46, 1926		£ 200 0 0
Unexpended balance	£ 200 0 0	
	£ 200 0 0	£ 200 0 0

Appendix B

Statement of Reimbursements to Government, and Value of Produce Supplied to Other Institutions during the Year Ended 31st December, 1927.

1. REIMBURSEMENTS TO GOVERNMENT.

Sale of vegetables	£183 3 4
Sale of plants	7 0 0
Sale of breeding stock	75 4 4
Live stock fees	52 8 0
Registration fees from seedsmen	3 5 0
Spraying services	12 13 0
Miscellaneous receipts	12 8 8
	£346 2 4

2. PRODUCE SUPPLIED TO OTHER INSTITUTIONS.

Milk to King Edward VII Memorial Hospital	£ 93 7 8
Vegetables to King Edward VII Memorial Hospital	30 19 1
Vegetables to other institutions	14 16 8
Vegetables and plants to bazaars, etc	10 0 0
Firewood to Hamilton Gaol	10 0 0
	£159 3 5

Appendix C

SUMMARY OF AGRICULTURAL CENSUS, 1927

	St. George's	Hamilton	Smiths	Devonshire	Pembroke	Paget	Warwick	Southampton	Sandys	Total
Number of farmers listed	26	33	45	36	15	49	34	44	32	314
Portuguese	1	—	22	16	6	34	20	22	12	133
Other white	15	22	14	11	2	9	6	7	8	94
Coloured	10	11	9	9	7	6	8	15	12	87
Owners	15	18	12	12	2	8	6	10	6	89
Part owners	3	5	5	2	2	1	1	—	3	22
Tenants	8	10	28	22	11	40	27	34	23	203
Total acres listed	61¾	157	215½	120	34	160¼	112¾	270	100¼	1,231½
Acres farmed by owners	35¼	66¾	58½	42½	5	26	12¾	39	12¾	298½
Acres farmed by part owners	14¾	24¾	39	7	9¾	11¾	7¾	—	9	123¾
Acres farmed by tenants	11¾	65½	118	70½	19¼	122½	92¼	231	78½	809¼
Acres under potatoes	31½	41¼	121½	65½	15	99¾	69¼	153¼	56¼	653¼
Acres under onions	2	14½	4½	4¾	2	3¼	4½	29¼	9½	74¼
Acres under green vegetables	12¾	29½	58¼	30½	8¼	33	26¼	73	26¼	297¾
Acres under celery	—	—	6	20½	8	8¼	10½	8¾	3	65
Acres under lilies	10	33½	13¼	8½	½	7½	—	2¼	¾	76¼
Acres under bananas	2½	34½	15¾	9¼	1½	8¼	2½	4	5½	83¾
Number of horses	6	36	45	44	15	35	25	41	21	268
Number of cows	53	70	98	65	49	85	38	80	38	576
Number of pigs	51	157	113	84	143	270	118	162	115	1,213
Number of poultry	690	1,357	1,910	1,287	589	2,126	1,226	1,531	865	11,581

Appendix D

Rainfall 1927 Recorded at Prospect by Royal Army Medical Corps.

Jan.	1	0.10	Mar.	1	0.36	May	1	0.22	July	1	0.04
	2	0.70		2	0.02		2	0.02		2	0.24
	3	—		3	0.10		3	—		3	0.04
	4	0.78		4	0.20		4	—		4	0.34
	5	0.28		5	0.26		5	—		5	0.42
	6	0.02		6	0.02		6	—		6	—
	7	0.28		7	0.04		7	—		7	—
	8	—		8	0.02		8	0.58		8	—
	9	—		9	0.04		9	—		9	—
	10	0.14		10	—		10	—		10	0.22
	11	0.26		11	0.44		11	—		11	—
	12	—		12	0.02		12	—		12	—
	13	0.02		13	—		13	—		13	—
	14	0.12		14	—		14	—		14	—
	15	0.18		15	—		15	—		15	0.02
	16	2.12		16	0.08		16	0.04		16	—
	17	—		17	—		17	2.64		17	0.50
	18	—		18	—		18	—		18	—
	19	—		19	—		19	—		19	—
	20	—		20	—		20	—		20	—
	21	0.02		21	—		21	—		21	0.34
	22	0.02		22	—		22	—		22	0.34
	23	—		23	—		23	—		23	0.36
	24	0.02		24	0.14		24	—		24	0.18
	25	—		25	0.16		25	—		25	0.40
	26	—		26	0.06		26	—		26	—
	27	0.70		27	0.04		27	0.38		27	—
	28	0.20		28	0.10		28	—		28	—
	29	0.12		29	0.20		29	—		29	—
	30	—		30	0.04		30	—		30	—
	31	—		31	0.10		31	0.18		31	—
		6.08			2.44			4.06			3.44
Feb.	1	0.04	Apr.	1	—	June	1	—	Aug.	1	—
	2	—		2	—		2	0.02		2	—
	3	0.04		3	—		3	0.20		3	—
	4	0.06		4	—		4	0.02		4	—
	5	—		5	—		5	0.34		5	—
	6	0.16		6	—		6	0.04		6	—
	7	0.02		7	—		7	—		7	—
	8	—		8	—		8	—		8	—
	9	0.04		9	—		9	0.74		9	0.32
	10	—		10	0.60		10	0.04		10	0.14
	11	0.32		11	0.06		11	—		11	—
	12	—		12	0.10		12	—		12	0.60
	13	0.06		13	—		13	—		13	0.72
	14	—		14	—		14	0.06		14	0.20
	15	0.08		15	0.02		15	0.04		15	0.34
	16	—		16	—		16	0.76		16	0.24
	17	—		17	—		17	0.24		17	0.08
	18	0.10		18	0.26		18	0.08		18	—
	19	—		19	—		19	0.80		19	0.02
	20	—		20	—		20	0.12		20	—
	21	0.48		21	—		21	0.20		21	—
	22	0.16		22	—		22	—		22	—
	23	—		23	—		23	—		23	—
	24	—		24	—		24	0.96		24	—
	25	0.02		25	—		25	—		25	0.24
	26	0.04		26	2.02		26	—		26	—
	27	1.04		27	—		27	—		27	—
	28	0.04		28	—		28	0.50		28	0.68
				29	—		29	—		29	0.50
				30	—		30	2.68		30	0.14
										31	0.20
		2.70			3.06			7.84			4.42

Sept.	1	0.12	Oct.	1	—	Nov.	1	—	Dec.	1	—
	2	—		2	—		2	0.04		2	—
	3	—		3	—		3	0.44		3	0.08
	4	—		4	—		4	0.04		4	—
	5	0.20		5	—		5	0.12		5	0.18
	6	0.04		6	0.14		6	—		6	0.08
	7	—		7	0.08		7	—		7	—
	8	0.02		8	0.08		8	—		8	0.02
	9	—		9	0.20		9	—		9	0.44
	10	—		10	—		10	—		10	0.02
	11	2.22		11	—		11	0.32		11	—
	12	0.30		12	—		12	—		12	—
	13	0.36		13	0.04		13	0.06		13	0.08
	14	—		14	—		14	—		14	—
	15	—		15	—		15	—		15	—
	16	—		16	0.16		16	—		16	—
	17	—		17	0.02		17	0.02		17	0.34
	18	—		18	0.14		18	0.06		18	—
	19	0.18		19	3.06		19	—		19	0.02
	20	—		20	0.16		20	0.30		20	0.38
	21	—		21	—		21	0.40		21	0.22
	22	—		22	0.04		22	—		22	0.40
	23	—		23	—		23	—		23	0.06
	24	0.10		24	—		24	—		24	0.12
	25	0.16		25	—		25	—		25	0.24
	26	0.02		26	—		26	0.14		26	—
	27	—		27	—		27	—		27	1.58
	28	—		28	0.06		28	—		28	0.10
	29	—		29	0.40		29	—		29	—
	30	—		30	0.50		30	—		30	—
				31	—					31	—
		3.72			5.08			1.94			4.36

Total rainfall for year, 48.84 inches.